UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
CINCINNATI PROCUREMENT OPERATIONS DIVISION
CINCINNATI, OHIO 45268

December 12, 2017

SUBJECT: Request for Task Order Proposal, Tracking Number PR-R2-18-00052

FROM: Greta Perry
Contracting Officer

TO: Multiple Award Contract Holders under TSAWP

Attached is request for task order proposal for the subject tracking number which is issued for competition for the project entitled, "US Virgin Islands Basic Water Quality Monitoring Program (USVI BWQM) Tasks".

The government requests you prepare a proposal for the task order. Request the proposals be submitted to Greta Perry by 4:30 on Friday, January 12, 2018 via FedConnect. The technical proposal is limited to 15 pages or less, excluding resumes. The Firm-Fixed Price (FFP) for this effort shall be included in the cover letter to the proposal. Proposals shall also include the required conflict of interest certification. Any information on pages beyond the page number limitation will not be considered or evaluation. The last day for Technical Questions to be submitted is noon on Friday, January 5, 2018 via FedConnect. For planning purposes it is anticipated that this work will commence on or around April 1, 2018.

The following documents provided for this solicitation will become part of the Task Order Award:

- Performance Work Statement
- US Virgin Islands Department of Planning and Natural Resources QAPP

Award of a Firm Fixed Price task order will result. The period of performance for this Task Order is a base period of 12 months plus 4 option periods of 12 months each. Please see attached technical evaluation criteria which will be used to evaluate the offer. Award will be made on Lowest Price Technically Acceptable basis. Award is intended to be made without discussions. Negotiations will be conducted only if determined necessary.

Any questions should be directed to the undersigned within five days of issuance of this Solicitation.

Greta Perry
Contracting Officer

Cc:
Helen Grebe, TOCOR
Damon Highsmith, CL COR

TASK ORDER SOLICITATION TECHNICAL EVALUATION
PR-R2-18-00052
US Virgin Islands Basic Water Quality Monitoring Program (USVI BWQM)

Contractors shall limit their responses to fifteen (15) pages or less, using their discretion on which criteria to place emphasis. Proposals will be evaluated on the criteria listed below by the project Technical Evaluation Team on a pass/fail basis. Award will be based on selection of the technically acceptable proposal with the lowest evaluated cost/price.

The following elements and acceptability criteria will be used in the technical evaluation of Task Order proposals:

Element	Acceptability	Pass	Fail
Technical approach: The Contractor's proposal should describe the technical approach for the development and performance of the tasks requested in the Performance Work Statement. Proposal should cover in detail the necessary preparation, field work, sampling instrumentation, sample and sample collection/handling.	To be acceptable, measures will be the conformance to the existing QAPP for BWQM and any suggested modifications.		
Proposal should cover in detail the necessary standard or accepted analytical work procedures, including laboratory QA, demonstration of capability, results of QA/QC documentation reference samples, e.g., NIST, and MDL studies as applicable, Reporting Limits (RLs) and how they were calculated, data presentation and reporting, QA project plan development and/or modifications as appropriate.	To be acceptable, measures will be the conformance to the existing QAPP for BWQM and any suggested modifications.		
The Contractor's proposal should describe the technical approach for the development and performance of data management, validation and reporting of results. Including data entered via WQX into STORET.	To be acceptable, measures will be the conformance to the existing QAPP for BWQM and any suggested modifications.		
Corporate Experience: The· Contractor's Proposal should describe the successful completion of projects/products which are similar to the tasks requested in the Performance Work Statement.	To be acceptable, the contractor must demonstrate successful completion of one project in each of the following areas: ambient water monitoring (preferably marine waters), analytical services for the required parameters and data entry and validation, as described in Tasks 2 and 3.		
Staffing: The Contractor's Proposal should describe the strengths and skills of the staff who will participate in the performance of the tasks requested in the Performance Work Statement through staff resume	To be acceptable the contractor must demonstrate that staff assigned to this project are trained and/or have experience in the following areas: project management, ambient water monitoring, laboratory analyses, data entry/ validation and report preparation/technical writing.		

TSAWP Multiple-Award Contracts
TASK ORDER
PR-R2-18-00052

U.S. VIRGIN ISLANDS BASIC WATER QUALITY MONITORING PROGRAM (USVI BWQM) TASKS

The Federal Clean Water Act (CWA) requires the collection and use of ambient water quality information. Data supplied by the ambient monitoring program is used to generate information for the bi-annual Integrated Reports (IR), which combine water quality assessment pursuant to Section 305(b) of the CWA and the listing of impaired water bodies pursuant to Section 303(d) of the CWA. U.S. States and Territories are required to prioritize waters/watersheds and target high priority waters/watersheds for Total Maximum Daily Load (TMDL) development. The USVI water quality program began in the early 1970s and has evolved into a program covering a total of 136 stations throughout the USVI.

TASK 1.0

Kickoff Meeting, Reporting and Communication

The contractor shall participate in a Kickoff Meeting with the EPA Task Order Contracting Officer Representative (TOCOR) via conference call to discuss the following: points of contact, roles and responsibilities, Quality Assurance protocols, timelines, the schedule of benchmarks, milestones and deliverables, establish dates and times for monthly calls and monthly technical progress reports and general Task Order administrative information.

The EPA TOCOR will coordinate and set-up monthly working calls between EPA staff and the contractor's technical lead to discuss the status and progress of the work under this Task Order. The contractor shall participate in these monthly calls. The frequency of the monthly conference calls may be modified based on project status at the request of the contractor and only as approved by EPA. The contractor shall provide meeting summaries including the progress reports, after the monthly calls within five (5) business days in draft form for the TOCOR to review, the TOCOR will provide edits and/or comments on the meeting minutes summaries and progress reports within 5 business days; then a final written deliverable would be expected within five (5) business days after receipt of written technical direction from the TOCOR, including the TOCOR's comments and edits to the draft deliverable.

The contractor shall notify the EPA TOCOR of any problems, delays or questions as soon as they arise, including immediate notification of any quality assurance issues, and Task Order delays. The contractor shall provide a monthly progress report included within the monthly conference call meeting summaries in accordance with the contract requirements which will be used for invoice review purposes.

Deliverables:

- Monthly conference calls and meeting minutes,
- Immediate notification to TOCOR of any delays
- Monthly progress reports and
- Timely Communication.

See Section F: Quality Control Surveillance Plan for specific performance standards and indicators related to this Task. All final versions of final deliverables must be compliant with Section 508 of the Americans with Disabilities Act.

TASK 2.0 – Quarterly Basic Water Quality Monitoring (BWQM) Program

Description:

The contractor shall be responsible for conducting the USVI BWQM program on a quarterly basis as described in the Virgin Islands Department of Planning and Natural Resources, Division of Environmental Protection (VIDPNR-DEP or DEP) most current Ambient Water Monitoring Quality Assurance Project Plan (QAPP), Attachment A. Station locations will be established by DEP's QAPP or slightly modified locations will be supplied by the TOCOR.

EPA is looking for the lowest costs possible while maintaining technically acceptable performance. Since this project is ambient water monitoring, a certified laboratory is not required. However, the laboratory must provide a demonstration of capability and follow accepted and acceptable good laboratory practices. This documentation shall be provided within one week of award to EPA for review. EPA will review the documentation and provide approval for work to commence or required revisions within 10 days of award.

The contractor shall measure all in-situ parameters and collect samples for analysis by a laboratory at each station as follows:

- Total number of sites: 136.
- Sites per island: St. John – 21; St. Thomas – 60; St. Croix – 55.
- Monitoring frequency: quarterly.
- Field Parameters: depth, pH, temperature (T), Dissolved Oxygen (DO), salinity, turbidity (NTU), Secchi depth.
- Laboratory Parameters: Enterococci, Total Phosphorus (TP), Total Nitrogen (TN) and Total Suspended Solids (TSS).

Field methodology, sampling instrumentation and equipment must be equivalent to the one used by DEP and laboratory analyses must be by EPA or other acceptable analytical methods, comparable to those described in the QAPP. The contractor shall be responsible for the collection of all samples and their shipment to a suitable laboratory within the recommended holding times of each sample. The contractor shall store/preserve samples prior to shipment to the laboratory for analysis. The contractor shall provide their field SOPs, laboratory SOPs, a demonstration of capability, results of QA/QC documentation reference samples, e.g., NIST, and MDL studies as applicable, Reporting Limits (RLs) and how they were calculated, conducted on an appropriate matrix, i.e., seawater, to EPA with the project proposal and with the results of each monitoring event or each batch of analytical results as appropriate, as well as with the final data package. EPA will review the contractor's project design and QA documentation and approve it prior to the start of any work.

Under this PWS, the contractor shall perform all analyses using accepted analytical methods. The contractor shall ensure that all samples are preserved in accordance with the requirements of those methods. The contractor shall ensure that all QA/QC requirements specified in applicable laboratory SOPs are followed for this project. The contractor shall report down to 1/3 of their RL. Any result between the RL and 1/3 RL shall be qualified as "estimated."

Deliverables:

- The quarterly monitoring schedule; any deviations, including the justification(s) must be approved by EPA prior to conducting monitoring work;
- Record of quarterly completion of field work and final report (including full data package, results and results discussion/recommended next steps).

TASK 3.0 – Field and Analytical Results and Supporting Documentation

Description:

For each quarter, within forty-five (45) business days of receipt of the last quarterly sample, the contractor will provide EPA and VIDPNR-DEP with results and supporting documentation. The minimum content of the deliverables (data package) is outlined below:

- Field and analytical results sorted by station/sample ID.
- Summary results for each QC sample type, e.g., Method Blank, LCS, SRM, MS.
- Most recent calculated Method Detection Limit.
- Most recent calculated Method Reporting Limit.
- Discussion of any field and/or analytical problems encountered and their resolution.
- Date/time of sample receipt, preservation, and analysis.
- Calibration logs for all field instrumentation, laboratory calibration standards, blanks, continuing calibration verification and laboratory duplicates, as applicable.
- Instrument adjustments, data corrections, or other anomalies if applicable.
- Raw data including all instrument readouts and data pertinent to the reconstruction of the analysis and results used for sample and QC analyses.
- Photocopies of all chains of custody.
- Data entered via WQX into STORET, including but not limited to: Monitoring Location ID, Activity ID, Activity Type, Activity Media Name, Activity Start Date, Activity Start Time, Activity Start Time Zone, Activity Depth/Height Measure, Activity Depth/Height Unit, Sample Collection Method ID, Sample Collection Equipment Name, Characteristic Name, Result Value, Result Unit, Result Measure Qualifier, Result Sample Fraction, Result Status ID, Result Value Type, Result Analytical Method ID, Result Analytical Method Context, Analysis Start Date, Result Detection/Quantitation Limit Type, Result Detection/Quantitation Limit Measure, Result Detection/Quantitation Limit Unit, Result Comment.

Deliverables must be provided in electronic format accepted by EPA and VIDPNR-DEP (Excel for data and similar outputs, Word or pdf format for narratives). The contractor shall be responsible for entering the data results via WQX data exchange into EPA's STORET system under their own entity. The contractor shall be responsible for the accuracy of the data entered into STORET that is received from its field personnel and its laboratory, including sufficient significant figures of coordinates and data results. The contractor shall report quality control of the data upload to the EPA.

TASK 4.0 Option year 1: Tasks 1.0, 2.0 and 3.0 reflected above.

TASK 5.0 Option year 2: Tasks 1.0, 2.0 and 3.0 reflected above.

TASK 6.0 Option year 3: Tasks 1.0, 2.0 and 3.0 reflected above.

TASK 7.0 Option year 4: Tasks 1.0, 2.0 and 3.0 reflected above.

A. SCHEDULE OF BENCHMARKS & DELIVERABLES:

TASK/Days	BASE PERIOD [April 2018 - March 2019]	Due Date
0-90 days	April – May - June	
1	Kick-off meeting, within 10 days of Task Order award.	April 2018
2	QA project documentation as described in the PWS approved by EPA before work can start.	April 2018

2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	April 2018
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than June 30, 2018.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than August 31, 2018.
91-180 days	July – August - September	
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	July 2018
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than September 30, 2018.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than November 30, 2018.
181-270 days	October – November - December	
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	October 2018
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than December 30, 2018.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than February 28, 2019.
271-365 days	January – February - March	
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	January 2019
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than March 30, 2019.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than May 31, 2019.

TASK/Days	OPTION PERIOD 1 [April 2019 - March 2020]	Due Date
0-90 days	April – May - June	
1	Kick-off meeting, within 10 days of Task Order award.	April 2019
2	QA project documentation as described in the PWS approved by EPA before work can start.	April 2019
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	April 2019
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than June 30, 2019.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than August 31, 2019.
91-180 days	July – August - September	
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	July 2019
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than September 30, 2019.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than November 30, 2019.
181-270 days	October – November - December	
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	October 2019
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than December 30, 2019.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than February 28, 2020.
271-365 days	January – February - March	
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	January 2020

3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than March 30, 2020.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than May 31, 2020.

TASK/Days	**OPTION PERIOD 2 [April 2020 - March 2021]**	**Due Date**
0-90 days	April – May - June	
1	Kick-off meeting, within 10 days of Task Order award.	April 2020
2	QA project documentation as described in the PWS approved by EPA before work can start.	April 2020
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	April 2020
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than June 30, 2020.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than August 31, 2020.
91-180 days	July – August - September	
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	July 2020
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than September 30, 2020.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than November 30, 2020.
181-270 days	October – November - December	
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	October 2020
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than December 30, 2020.

3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than February 28, 2021.
271-365 days	January – February - March	
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	January 2021
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than March 30, 2021.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than May 31, 2021.

TASK/Days	**OPTION PERIOD 3 [April 2021 - March 2022]**	**Due Date**
0-90 days	April – May - June	
1	Kick-off meeting, within 10 days of Task Order award.	April 2021
2	QA project documentation as described in the PWS approved by EPA before work can start.	April 2021
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	April 2021
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than June 30, 2021.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than August 31, 2021.
91-180 days	July – August - September	
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	July 2021
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than September 30, 2021.

3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than November 30, 2021.
181-270 days	October – November - December	
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	October 2021
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than December 30, 2021.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than February 28, 2022.
271-365 days	January – February - March	
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	January 2022
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than March 30, 2022.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than May 31, 2022.

TASK/Days	**OPTION PERIOD 4 [April 2022 - March 2023]**	**Due Date**
0-90 days	April – May - June	
1	Kick-off meeting, within 10 days of Task Order award.	April 2022
2	QA project documentation as described in the PWS approved by EPA before work can start.	April 2022
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	April 2022
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than June 30, 2022.

3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than August 31, 2022.
91-180 days	July – August - September	
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	July 2022
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than September 30, 2022.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than November 30, 2022.
181-270 days	October – November - December	
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	October 2022
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than December 30, 2022.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than February 28, 2023.
271-365 days	January – February - March	
2	BWQM program schedule for quarterly sampling to EPA two weeks prior to the monitoring event.	January 2023
3	Conduct BWQM program quarterly monitoring and submit record of completion within one week of finishing all field work.	TBD after EPA approval of schedule, no later than March 30, 2023.
3	BWQM program analytical data package including STORET/WQX entry, submitted within 45 business days of receipt of the last quarterly sample to TOPO for EPA approval.	TBD After EPA approval of schedule, no later than May 31, 2023.

Any and all deliverables specified in this PWS will be delivered to:

Helen Grebe
Environmental Scientist
USEPA Region 2
Division of Environmental Science and Assessment/Monitoring and Assessment Branch (MS-220)
2890 Woodbridge Avenue

Edison, NJ 08837
Grebe.helen@epa.gov

When the Task Order reaches 30 calendar days prior to the end of the Period of Performance in a given period, the contractor shall make a determination that the deliverables, milestones, benchmarks, and any outstanding technical direction from the TOCOR, will be satisfactorily completed in the form requested in the PWS by the end of the Period of Performance and for the remaining funding that is available.

If the contractor determines one or more of the above-referenced items will not be able to be completed in the requested form within the period of performance and with the available funding, the contractor shall notify the TOCOR and the CO immediately. Within 5 business days of said notification, the TOCOR in coordination with the CO will provide technical direction concerning use of the remaining funding to prepare and furnish to the TOCOR all interim draft deliverables, interim work products, and any working files in an electronic format which is supported by EPA, for eventual continuation of the project after the end date of the Task Order.

B. REPORTING

All documentation and reporting under this Task Order shall be in compliance with contract requirements. See contract clause F.3, F.4, and J.2 "List of Attachments, Number 2 - Reports of Work".

Additional requirements specific to this Task Order are as follows: N/A

C. TRAVEL

All travel under this Task Order shall be in compliance with contract requirements. See contract clause H.28.

EPA expects that the contractor may need to travel to the USVI for performance of this Task Order, if the contractor is not on island. The estimated travel needs are presented below:

TASKS	FREQUENCY	DURATION	NUMBER OF PEOPLE
Tasks 1– initial Meeting with DPNR_DEP if needed	1	2 days	3-5 (max)
Tasks 2 - BWQM Program	4	7 - 12 days each	3 - 4 people

D. CONTRACTOR IDENTIFICATION

Contractor personnel shall always identify themselves as Contractor employees by name and organization and physically display that information through an identification badge. Contractor personnel are prohibited from acting as the Agency's official representative.

The Contractor shall refer any questions relating to the interpretation of EPA policy, guidance, or regulation to the TOCOR.

E. CONFERENCE/MEETING GUIDELINES AND LIMITATIONS:

The EPA projects that none of the individual meetings identified in these tasks will exceed a total cost of $20,000. The contractor shall immediately notify the EPA Contracting Officer, PO and TOCOR of any anticipated individual event involving support for a meeting, conference, workshop, symposium, retreat, seminar or training that may potentially incur $20,000 or more in cost during performance. Conference expenses are all direct and indirect costs paid by the government and include any associated authorized travel and per diem expenses, room charges for official business, audiovisual use, light refreshments, registration fees, ground transportation and other expenses as defined by the Federal Travel Regulations. All outlays for conference preparation should be included, but the federal employee time for conference preparation should not be included. After notifying EPA of the potential to

reach this threshold, the Contractor shall not proceed with the task(s) until authorized to do so by the Contracting Officer.

F. QUALITY ASSURANCE SURVEILLANCE PLAN: EPA will judge performance for all Tasks using the following Quality Assurance Surveillance Plan (QASP).

Performance Requirement	**Measureable Performance Standards**	**Surveillance Method**	**Incentives/ Disincentives**
Management and Communications: The Contractor shall maintain contact with the EPA CO and TOCOR throughout the performance of the task order and shall immediately bring potential problems to the attention of the EPA TOCOR. In cases where issues have a direct impact on project schedules, cost, time, or quality, the contractor shall provide options for EPA's consideration on resolving the issues or mitigating their impacts.	Any issue adversely impacting project schedules, cost, time or quality shall be brought to the attention of the EPA TOCOR within 3-working days of occurrence.	All deliverables will be reviewed by the EPA TOCOR (via monthly progress report) to identify unreported issues.	Two or more incidents where the contractor does not meet the measureable performance will be considered unsatisfactory performance and will be reported as such in the CPARS Performance Evaluation System under the category of **Business Relations**. Fewer than two incidents per task order where the contractor does not meet the measureable performance standard will be considered acceptable performance and will be reported as such in the CPARS Performance Evaluation System under the category of Business Relations.
Timeliness: Services and deliverables shall be in accordance with schedules slated in the task order, unless amended or modified by an approved EPA action.	No more than 25% of all deliverables shall be submitted more than 3 working days past the due date.	100% of the deliverables will be reviewed by the EPA TOCOR monthly (via monthly progress report & milestones established for each deliverable) to compare actual delivery dates against those approved.	Unsatisfactory rating under the category of **Timeliness** in CPARS when the contractor does not meet the measurable performance standards.
Cost Management and Control. The Contractor shall monitor, track, and accurately report cost and fee expenditures to EPA through progress reports and approved special reporting requirements. The Contractor shall assign appropriately leveled and skilled personnel to all tasks, practice and encourage time management, and	The contractor shall manage costs to the level of approved ceiling on the task order. The contractor shall notify the TOCOR, contract PO, and CO when 75% of the approved funding ceiling for the task order is reached.	The TOCOR will review monthly progress reports & milestones established for each deliverable to compare actual versus projected expenditures.	Unsatisfactory rating under the category of **Cost Control** in CPARS when the contractor does not meet the measurable performance standards during an applicable period of performance. An acceptable rating will be reported in the CPARS Performance Evaluation System under the category of Cost Control if the contractor meets the

Performance Requirement	Measureable Performance Standards	Surveillance Method	Incentives/ Disincentives
ensure accurate and appropriate cost control.			measureable performance standards and accurately reports the costs in the progress reports according to the requirements in the "Reports of Work" attachment to the RFP.
Technical Effort. The Contractor shall abide by its QMP and document SOP in performing work on this task order.	No more than 25% of reviewed deliverables and work products shall require revisions to meet the requirements of the QMP, PWS, and technical direction.	All deliverables will be reviewed by the EPA TOCOR to identify noncompliance issues with the QMP, PWS, and technical direction.	Unsatisfactory rating under the category of **Quality of Product or Service** in CPARS when the contractor does not meet the measurable performance standards during an applicable period of performance.

G. ATTACHMENTS

This section provides additional detailed project background or other necessary reference materials for contractor performance.

Attachment A – VIDPNR-DEP Ambient Water Monitoring Quality Assurance Project Plan

Attachment A: VIDPNR-DEP Ambient Water Quality monitoring Program QAPP

Included as separate pdf document

DEPARTMENT OF PLANNING AND NATURAL RESOURCES

Division of Environmental Protection
Water Quality Management Program

Quality Assurance Project Plan

Ambient Water Quality Monitoring Program

FY 2017

Quality Assurance Project Plan (QAPP)

Ambient Water Quality Monitoring Program
United States Virgin Islands

December 2016

Title

Ambient Water Quality Monitoring Program, United States Virgin Islands
Quality Assurance Project Plan

Department of Planning and Natural Resources (DPNR)
Division of Environmental Protection
Water Quality Management Program

Revision 07/2016

Approval

Department of Planning and Natural Resources (DPNR)

Norman Williams _____
Director
DPNR-DEP
(340) 773-1082

Benjamin Keularts _____
Environmental Program Manager
Water Pollution Control Program
(340) 773-1082

Nadalie Joseph _____
Quality Assurance Officer
QA/QC Program
(340) 773-1082

Laboratory Approval

Amy Dempsey _____
Vice President
Ocean Systems Laboratory, Inc.

(340) 718-3246

Paul Jobsis, Ph.D.

Acting Director, UVI – Center for M&ES

#2 John Brewer's Bay

St. Croix, VI 00802

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Revision Record

Revision Number	Date (mm/yyyy)	Responsible Individual	Description of Change
--	--	--	New
1	11/1989	Marcia Taylor	Updated
2	11/2006	Violeta Villanueva-Mayor	Revision
3	11/2007	Anita E. Nibbs	Updated program/staff names
4	11/2008	Anita E. Nibbs	Updated header
5	11/2009	Anita E. Nibbs	Updated staff names/headers
6	02/2013	Karima Fredericks-Liburd/ Anita E. Nibbs	Incorporated FY10 QSA Comments; Updated for FY12 Programmatic Changes
7	07/2015	Anita E. Nibbs	Incorporated QAO Comments; Updated for Programmatic Changes
8	12/2016	Benjamin Keularts	Incorporated EPA Comments; Updated for Programmatic Changes

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1. Distribution list

A copy of this QAPP will be distributed to the following personnel who will participate in the collection or analysis of environmental data and to those who are responsible for managerial and quality assurance aspects. Distribution will be either in electronic format or hardcopy. The following list does not include everyone who desires a copy of this QAPP. This document will be made available, upon request, to anyone interested in the monitoring of water quality.

Department of Planning and Natural Resources – Environmental Protection:

Kent Bernier, WQM
Leah Motta, WQM
Wayne Donadelle, WPC
Karima Fredericks-Liburd, WQM
Benjamin Keularts, WPC/WQM
Nadalie Joseph, QA
Akil Jacobs, WPC
Beverly Thomas, WQM

Analytical Laboratories, USVI:

Amy Dempsey, Ocean Systems Laboratory, Inc.
Paul Jobsis, Ph.D., UVI Center for Marine and Environmental Studies Laboratory

US EPA:

Helen Grebe, Project Officer, US EPA

2. Project/task organization

2.1. Government organizations

The Ambient Water Quality Monitoring program is a coordinated effort among three organizations. The following is a list of the organizations and their role:

- *Division of Environmental Protection (DEP) - Virgin Islands Department of Planning and Natural Resources* - responsible for the overall coordination, technical support, and personnel necessary to conduct field activities. All results from the laboratories are delivered to DEP for their assessment. DEP is responsible for all analyses and conclusions derived from the data collection.

- *Ocean Systems Laboratory, Inc. - St. Croix and St. Thomas*- performs analyses of water samples for bacteria (enterococcus) and total suspended solids. If deemed necessary, can mail nutrients sample out of Territory for analyses or ship to UVI Laboratory in St. Thomas.

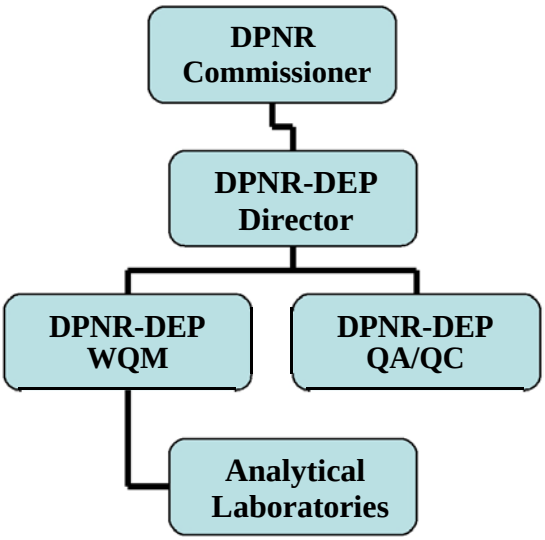
- *University of the Virgin Islands (UVI) – St. Thomas* performs analyses of water samples for bacteria (enterococcus), total suspended solids and nutrients (Total Nitrogen and Total Phosphorus).

2.2. Specific key project personnel

- Program Manager: Benjamin Keularts, DPNR-DEP, (340) 773-1082. The Program Manager for the Water Quality Management Program (WQM) ensures that all activities are performed according to the program's work plan. Responsible for the overall organization of field activities and ensures that objectives are met.

- Quality Assurance Officer: Nadalie Joseph, DPNR-DEP, (340) 773-1082. The QA Officer is responsible for reviewing and approving all QA related activities of this program - both sampling and analyses.

Figure 1. Organizational chart of the Ambient Water Quality Monitoring Program.



3. Training requirements/certification

Field crew members will be personnel selected from both the Water Quality Management (WQM) program and Water Pollution Control Program (WPC). In most instances 3 to 4-person field crews will conduct the sampling.

All personnel involved in sample collection and/or water quality measurements will be made familiar with this QAPP and related standard operational procedures (SOP). First time samplers will be trained or supervised by an individual that has been QA/QC audited in the methods of sampling and data gathering. The QMP's Program Responsibility states that, for the Ambient Program, samples shall be sent to an EPA certified laboratory or a Laboratory that demonstrates proficiency for chemical analysis but does not specify analyst. Only the laboratory is certified for the method, not the analyst.

The vessel operator should be an experienced boat handler, and should be certified as having completed at least minimal U.S. Coast Guard boating safety training for the appropriate respective vessel, as well as well-versed in the safe and correct operation of on-board sample collection equipment and processes, including navigation skills and the use of GPS equipment. The vessel itself shall contain all proper U.S. Coast Guard-required personal floatation devices and other safety gear, have current state registration, and be in good operation and maintenance condition.

Likewise, documentation of completion of a driver safety training course is highly recommended for all field staff, including the safe use and operation of a vehicle, boat/trailer towing and maneuvering to back-up, 4-wheel drive operation, etc. All vehicles shall have current registration and be in good operation and maintenance condition.

All crews will be evaluated on their field performance during field QA audits conducted by the QA Officer. If any deficiencies within a crew are noted during this QA audit, they will be documented and remedied prior to continue field sampling. This can be accomplished by additional training or by changing crew composition, but verification of correction of any deficiencies must be documented in writing prior to the resumption of further sample collection activities.

4. Problem definition/background

The USVI Code established the Department of Planning and Natural Resources (DPNR) as the environmental protection/regulatory agency. The U.S. Environmental Protection Agency (EPA) Region 2 has delegated responsibility for environmental protection to the DPNR's Division of Environmental Protection (DEP). DEP operates the Water Quality Management (WQM) program, which has oversight of the Coastal (Ambient) Water Quality Monitoring program. The Ambient Water Quality Monitoring program (also referred to as Ambient Monitoring) is responsible for the collection of chemical and physical water parameters and water samples to evaluate water quality as it relates to USVI Water Quality Standards, Title 12 V.I.R.&R., Chapter 7,§186.

4.1. Problem definition

The coastal waters of the USVI are valuable resources that provide important habitat for plants and animals, support the commercial and recreational fisheries, represent travel ways for coastal and international shipping, and are the basis for tourism and recreation industries. However, population growth and industries in proximity to coastal areas threaten the ecological condition of the Territory's coastal environment.

The Federal Clean Water Act (CWA) requires the use and collection of ambient water quality information. Section 305(b) of the CWA requires that states and other jurisdictions receiving CWA grant funding submit a water quality report to USEPA every two years. The 305(b) report contains summary information about water quality conditions. States and territories must also identify and prepare a list [Section 303(d) list] of waters that do not meet water quality standards after applying existing required controls. States are required to prioritize waters/watersheds and target high priority waters/watersheds for Total Maximum Daily Loads (TMDL) development. Data generated by the Ambient Monitoring program and findings will provide direct support for the 305(b) and 303(d) requirements.

4.2. Background

USVI water quality monitoring began in the early 1970's and it has gradually evolved into the present Ambient Water Quality Monitoring program which is overseen by DEP, under the WQM program. Ambient Monitoring is conducted at a total of 164 stations throughout the USVI.

WQM is also responsible for conducting episodic monitoring as a response for periods of noncompliance by permitted facilities that discharge into the waters of the USVI or when water quality concerns are reported as a result of storm water runoff. Episodic monitoring generally follows the Emergency Response Plan protocol.

5. Project/task description

The Ambient Water Quality Monitoring program consists of quarterly monitoring of water chemical and physical parameters at 138 nearshore sites and 26 offshore sites around St. Croix, St. Thomas, Hassel Island, Water Island and St. John, USVI.

Samples are collected using 500 mL or 1.0 L bottles provided by the analytical laboratories. Field measurements are also collected on site by DEP staff with each sample collection. These measurements are taken using an YSI 6600 Multi-parameter sonde.

All data is initially managed using a Microsoft Excel Water Exchange (WQX) Web Template. Data is also uploaded into the STORET national database using the STORET Interface Module (SIM) via WQX. The data is used to determine the overall condition of territorial coastal water and to publish the biannual 303(d) list of impaired waters and the 305(b) integrated report.

All participants in this project are required to read and become familiar with this QAPP prior to the initiation of sampling. All participants are, or will be, trained in the methodologies for each of the measurements required for this project prior to sample collection. The QA Officer will audit field sample collection and laboratory performance.

6. Quality objectives and criteria for monitoring data

The primary goal of the Ambient Monitoring program is to document a set of environmental indicators to estimate the condition of the marine waters in the USVI in relation to human health concerns, ecological condition, and designated uses. The focus of the assessment includes areas located directly in, and areas within the influence of, point- and non-point sources of pollution, harbors, marinas, popular beaches, and areas believed to be unaffected by pollution.

Ambient Monitoring data provide a basis for the establishment of management policies that promote the protection, restoration, and wise use of surface-water resources.

The specific objectives of the Ambient Monitoring program are:

- To collect data to determine the overall condition of water bodies.
- To provide information required for 303(d) and 305(b) reporting.
- To identify existing and emerging problems and to establish status related to water quality.
- To determine permitted facilities' compliance and effectiveness of the Territorial Pollutant Elimination System Program (TPDES).
- To monitor and respond to events that threaten to degrade water quality.
- To provide supplemental data for research projects.
- To provide an education and outreach tool.

6.1 Precision and accuracy

The precision and accuracy of data are determined by particular actions of the analytical laboratory and field staff. The precision of data is a measure of the reproducibility of the measurement when an analysis is repeated. The precision of selected chemical analyses will be examined by using standard solutions and comparison of duplicate analysis. Relative percent difference (RPD) will be calculated for field duplicate analysis to assess precision of field collection procedure. Laboratory precision will be determined by calculating RPD of results of "unknown" analysis and laboratory duplicate analysis. The following is the formula used for calculation of RPD:

$$\mathbf{RPD = \{(C_1 - C_2)/[\ (C_1 + C_2)/2]\} \times 100}$$

RPD= Relative Percent Difference
C_1= Larger of two observed values
C_2= Smaller of two observe values

Accuracy is the closeness of a measured result to an accepted reference value. Accuracy is usually measured as a percent recovery. QC analyses used to measure accuracy include standard recoveries, laboratory control samples, spiked samples, blank samples and surrogates.

Using a field blank, trace sources of artificially introduced contamination can also be determined should analysis provide different results than expected.

It is the responsibility of the program manager to verify that the data are representative while the analytical data's precision, accuracy, and comparability are mainly the responsibility of the laboratory supervisor.

6.2. Representativeness

The representativeness of the data is mainly dependent on the sampling locations and the sampling procedures adequately representing the true condition of the sample site. Sampling station siting, and use of only approved/documented analytical methods will determine that the measurement data represent the conditions at the site, to the extent possible. It is well known that water flowing past a given location on land is constantly changing in response to inflow, tidal cycle, weather, etc. Sampling schedules will be designed with respect to frequency, locations and methodology in order to maximize representativeness, where possible and applicable.

Laboratory representativeness will be achieved by following analytical procedure and standard operating procedures, meeting holding times, and assessment and comparison of field duplicate samples.

6.3. Comparability

The comparability of data produced by and for DPNR is predetermined by the commitment of its staff and analytical laboratories to use standardized methods, where possible, including EPA approved analytical methods, or documented modifications thereof which provide equal or better results. These methods have specified units in which the results are to be reported.

6.4. Completeness

The completeness of data is basically a relationship of how much of the data is available for use compared to the total potential data before any conclusion is reached. Ideally, 100% of the data should be available. However, the possibility of data becoming unavailable due to laboratory error, insufficient sample volume, or samples broken in shipping must be expected. Also, unexpected situations may arise where field conditions do not allow for 100% data completeness. Failure to achieve 100% data completeness usually will result from the field crew’s inability to sample at stations because of logistical barriers, such as insufficient depth, or adverse weather conditions. In the limited number of instances where these may be encountered, efforts will be made to relocate the station in an adjacent area or re-sample the station. In addition, established protocols for tracking samples during shipment and laboratory processing must be followed to minimize data loss following successful sample collection.

6.5. Analytical Method and Instrument Sensitivity

6.5.1. Analytical Method Sensitivity

Table 1. Sensitivity of Analytical Methods Employed

Parameter	*Analytical Method*	*Reporting Limit*	*WQS*
TSS	2540D & ASTM D3977-97	1 mg/L (with sample of 1000mL)	N/A
Enterococci Bacteria	IDEXX Enterolert Quanti-Tray	1 colony/100mL	110 CFU/100 mL
Total Phosphorous	365.1	0.05 mg/L	0.05 mg/L
Total Nitrogen		0.20 mg/l	N/A

6.5.2. Instrument Sensitivity

Table 2. YSI 6600 Instrument Sensitivity

Medium	Fresh, sea, or polluted water
Computer interface	RS-232, SDI-12
Logging memory	384K; logs at programmable intervals and stores 150,000 readings
Software	EcoWatch for Windows
Size	3.5”ODx20.4” Length (8.5x52cm)
Weight with batteries	6 lbs (2.7kg)
Internal power supply	Sonde: 8 C alkaline cells Display: 4 C alkaline cells
Depth	0 to 656 feet (200 meters)
Temperature	Range: -5 to + 45°C Accuracy: ±0.15°C
Dissolved Oxygen	Range: 0 to 50 mg/L Accuracy: 0.2 mg/L
pH	Range: 0 to 14 units Accuracy: ±0.2 unit
Salinity	Range: 0 to 70 ppt Accuracy: 0.1 ppt
Turbidity	Range: 0 to 1,000 NTU Accuracy: 2 NTU

7. Field monitoring requirements

USVI water quality monitoring was initiated by the Health Department in the early 1970's. Sites were selected following a judgmental design, resulting in a network of fixed monitoring stations within embayments and nearshore waters of the islands. Monitoring variables included dissolved oxygen, fecal coliform, salinity, temperature, and turbidity. However, data were collected irregularly and with inconsistent methodology.

The monitoring program has gradually evolved into the present Ambient Water Quality Monitoring program which is overseen by DEP, under the WQM program.

The CWA required states and territories to identify and report to EPA their water quality-limited waters. In addition, states and territories are required to develop Total Maximum Daily Loads (TMDLs) for those waterbodies that are listed as not meeting their designated end uses. Prior to the development of TMDLs, however, waterbodies must be delineated following certain criteria.

Delineation of waters into assessment units (AUs) is an essential step in designing an ambient water quality monitoring program for the USVI. Previously, Territorial waters within the 3 nm limits of St. Croix, St. Thomas, and St. John were delineated into 84, 59, and 33 waterbody AUs, respectively, (Battelle, 2003). AUs surrounded primarily by land and having restricted mixing and circulation were classified as embayments. Seaward of them, AUs were identified as nearshore if they had at least some portion of the AU in contact with land. Embayments and nearshore bodies of water may be impacted by point and non-point sources from the adjacent land mass. Offshore AUs are bounded on all sides by water and are generally thought to be well mixed and any inputs from land are likely to be highly dispersed prior to reaching these waters. Currently, DEP uses the Battelle delineation of USVI coastal waters into 176 AUs. However, it is recognized that this delineation scheme suffers from a number of shortcomings (Battelle 2003, Crawford, in prep.). A revision of the delineation for USVI coastal waters is being prepared which may supersede the Battelle system (Crawford, in prep.). For quality assurance purposes, implementation of revised AUs will require revision of this QAPP for Ambient Water Quality Monitoring program.

Table 3. Assessment Units and Related Monitoring Stations

Assessment Unit ID	Assessment Unit Name & Class	Frequency/Parameters	Associated Monitoring Stations
VI-STT-01	Botany Bay Class B	pH, Temperature, Dissolved Oxygen, Depth, Salinity, Secchi, Enterococci Bacteria, Turbidity monitored Quarterly	STT-9 Botany Bay
VI-STT-02	Stumpy Bay Class B		STT-10 Stumpy Bay

VI-STT-03	Botany Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STT-04	Santa Maria Bay Class B		STT-11 Santa Maria Bay
VI-STT-05	Caret Bay Class B		STT-12 Caret Bay
VI-STT-06	Neltjeberg Bay Class B		STT-13B Neltjeberg Bay
VI-STT-07	Dorothea Class B		STT-13 Dorothea
VI-STT-08	Hull Bay Class B		STT-14 Hull Bay, VI616865 Hull Bay
VI-STT-09	Dorothea Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STT-10	Magens Bay Class B		STT-15, STT-15A, STT-15B Magens Bay, VI672756 Magens Bay
VI-STT-11	Northwest St. Thomas HUC14, offshore Class B		STT-OFF1 STT NW-1, STT-OFF9 STT NW-3
VI-STT-12	Lovenlund Bay Class B		There are currently no monitoring stations within this assessment unit.
VI-STT-13	Mandahl Bay		STT-16B Mandahl

	(Marina) Class B		Bay Entrance, STT-16C Mandahl Point Entrance
VI-STT-14	Tutu Bay		There are currently no monitoring stations within this assessment unit.
VI-STT-15	Sunsi Bay Class B		STT-17B Sunsi Bay
VI-STT-16	Spring Bay Class B		STT-17A Spring Bay
VI-STT-17	Mandahl Bay subwatershed, offshore Class B		STT-16A Mandahl Bay, STT-18 Coki Point Bay , VI577932 Coki Point
VI-STT-18	Water Bay Class B		STT-19 Water Bay, VI591668 Water Bay
VI-STT-19	Smith Bay Class B		STT-20 Smith Bay, VI431925 Lindquist Beach
VI-STT-20	Smith Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STT-21	St. John Bay Class B		STT-21A St. John Bay, VI327776 Sapphire Beach
VI-STT-22	Red Bay Class B		STT-21B Red Bay
VI-STT-23	Vessup Bay		STT-22B Vessup Bay, USGS-50263000

	Class B		Vessup Bay West
VI-STT-24	Red Hook Bay Class B		STT-22A Red Hook Bay, USGS-50263500 Vessup Bay East, VI764950 Vessup Bay
VI-STT-25	Great Bay Class B		STT-23 Great Bay, VI505006 Bluebeards Beach
VI-STT-26	Red Hook Bay, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STT-27	St. James Islands, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STT-28	Cowpet Bay Class B		STT-24 Cowpet Bay, STT-24A Cowpet Bay West
VI-STT-29	St. James Bay Class B		There are currently no monitoring stations within this assessment unit.
VI-STT-30A	Northeast St. Thomas HUC14, offshore north Class B		STT-OFF6 STT North-2, STT-OFF12 STT NE-4
VI-STT-30B	Northeast St. Thomas HUC14, offshore south Class B		There are currently no monitoring stations within this assessment unit.
VI-STT-31	Nazareth Bay Class B		STT-25B Secret Harbour, STT-26, STT-26A Benner Bay, VI389422 Secret Harbor

VI-STT-32	Jersey Bay, offshore Class B		STT-25 Nazareth Bay
VI-STT-33	Benner Bay Class B		USGS-50265900 Benner Bay South
VI-STT-34	Benner Bay Lagoon Marina Class B		STT-27D Mangrove Lagoon, Near Lavida Marina, STT-27E Mangrove Lagoon, Near Compass Point, USGS-50265700 Benner Bay North
VI-STT-35	Mangrove Lagoon Class B		STT-27A Mangrove Lagoon, Near Treatment Plant, STT-27B Mangrove Lagoon, Off Sanitary Landfill (East of Ecotours), STT-27C Mangrove Lagoon, Near Tropical Marine Fuel Dock, USGS-50278800 Mangrove Lagoon West, USGS-50278500 Mangrove Lagoon East
VI-STT-36	Frenchman Bay subwatershed, east Class B		STT-28A Bovoni Bay,STT-28B Bolongo Bay, VI951607 Bolongo Bay
VI-STT-37	Frenchman Bay Class B		STT-29A Frenchman Bay, VI891065 Frenchman’s Bay
VI-STT-38	Limetree Bay Class B		STT-29B Limetree Bay, VI776527 Limetree Bay

VI-STT-39	Morningstar Bay Class B		STT-30 Morningstar Bay, VI937158 Morningstar Bay
VI-STT-40	Pacquereau Bay Class B		STT-31A Flamboyant Cove
VI-STT-41	Frenchman Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STT-42	Southeast St. Thomas HUC14, offshore Class B		STT-OFF8 STT South-3, STT-OFF5 STT North2
VI-STT-43	St. Thomas Harbor, inner Class C		STT-31B Hassel Island, Off Navy Dock, STT-31C Hassel Island, Careening Cove, STT-32A Long Bay, Near South Dolphin, STT-32B Long Bay, Northeast Corner, STT-33A Long Bay, Off Outfall, STT-33B Long Bay, Off Outfall, STT-34 Long Bay, Off Pump Station, STT-35 Groden Bay, STT-36 St. Thomas Harbor, North of Coast Guard Dock, STT-37 St. Thomas Harbor, Cay Bay, STT-38 Haulover Cut
VI-STT-44	St. Thomas Harbor, outer Class B		There are currently no monitoring stations within this assessment unit.

VI-STT-45	Gregerie Channel Class B		STT-1 Crown Bay, Near Outfall, STT-39 Water Isle, East Gregorie Channel
VI-STT-46	Sprat Bay Class B		STT-42 Water Island Sprat Bay
VI-STT-47	Hassel Island at Haulover Cut to Regis Point Class C		STT-2 Crown Bay, Near Tamarind Outlet, STT-3 Subbase
VI-STT-48	Water Isle Hotel, Beach Class B		There are currently no monitoring stations within this assessment unit.
VI-STT-49	Druif Bay Class B		STT-40 Water Isle Hotel, Beach
VI-STT-50	Flamingo Class B		STT-41 Water Island Flamingo Bay
VI-STT-51	Krum Bay Class C		STT-4 Krum Bay
VI-STT-52	Lindbergh Bay Class B		STT-5A Lindbergh Bay East, STT-5B Lindbergh Bay West, STT-5C WAPA Outfall, VI514102 Lindberg Bay
VI-STT-53	Cyril E. King Airport subwatershed, offshore Class B		STT-6C S.W. Road, Near Red Point Outfall
VI-STT-54	Perseverance Bay, offshore		STT-6B College Cove

	Class B		
VI-STT-55	Brewers Bay Class B		STT-7A Brewers Bay, VI293962 Brewer's Bay
VI-STT-56	Perseverance Bay Class B		STT-7B Perseverance Bay
VI-STT-57	Fortuna Bay Class B		STT-8 Fortuna Bay
VI-STT-58	Fortuna Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STT-59	Northwest St. Thomas HUC14, offshore Class B		STT-6A Airport Runway, STT-OFF2 STT NW-1, STT-OFF11 STT SW-4
VI-STJ-01	Caneel Bay Class B		STJ-54 Caneel Bay, NPS-1 Caneel Bay, VI658467 Caneel Beach
VI-STJ-02	Hawksnest Bay Class B		STJ-44B Hawksnest Bay, NPS-3 Hawksnest (middle beach), NPS-4 Hawksnest (Gibney Beach), VI255380 Oppenheimer
VI-STJ-03	Trunk Bay Class A		STJ-44A Trunk Bay, NPS-5 Trunk Bay
VI-STJ-04	Hawksnest Bay subwatershed,		NPS-2 Henley Cay

	offshore Class B		
VI-STJ-05	Cinnamon Bay Class B		STJ-44C Cinnamon Bay, NPS-6 Peter Bay, NPS-7 Cinnamon Bay
VI-STJ-06	Maho Bay/Francis Bay Class B		STJ-44D Francis Bay, NPS-8 Maho Bay, NPS-9 Francis Bay, VI536165 Big Maho Bay
VI-STJ-07	Maho Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STJ-08	Mary Point Class B		There are currently no monitoring stations within this assessment unit.
VI-STJ-09	Leinster Bay Class B		NPS-10 Leinster Bay
VI-STJ-10	Minnebeck Bay Class B		NPS-11 Haulover Bay, NPS-30 Newfoundland Bay, NPS-31 Haulover East
VI-STJ-11	Newfound Bay Class B		There are currently no monitoring stations within this assessment unit.
VI-STJ-12	North St. John HUC14, offshore Class B		STJ-OFF3 STJ NW-1, STJ-OFF10 STJ East-3
VI-STJ-13	Coral Harbor Class B		STJ-53 Coral Bay, NPS-15 Coral Bay Dock, NPS-16

			Johnson Bay, VI823989 Johnson's Bay, STJ-56 Johnson Bay
VI-STJ-14	Hurricane Hole Class B		NPS-13 Water Creek, NPS-14 Princess Bay
VI-STJ-15	Round Bay Class B		STJ-57 Round Bay
VI-STJ-16	Coral Bay Class B		NPS-12 Long Point, STJ-58 Privateer Bay
VI-STJ-17	Salt Pond Bay Class B		STJ-52 Salt Pond Bay, NPS-17 Salt Pond Bay
VI-STJ-18	Grootman Bay Class B		There are currently no monitoring stations within this assessment unit.
VI-STJ-19	Great Lameshur Bay Class B		STJ-51 Great Lameshur Bay, STJ-50 Little Lameshur Bay, NPS-18 Great Lameshur Bay, NPS-19 Yowsi Point, NPS-20 Little Lameshur Bay
VI-STJ-20	Southeast St. John HUC14, offshore Class B		STJ-OFF7 STJ East-2
VI-STJ-21	Genti Bay, nearshore Class B		STJ-49 Genti Bay, NPS-21 Reef Bay
VI-STJ-22	Genti Bay, offshore		There are currently no monitoring stations

	Class B		within this assessment unit.
VI-STJ-23	Fish Bay Class B		STJ-48 Fish Bay, NPS-22 Fish Bay
VI-STJ-24	Fish Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STJ-25	Rendezvous Bay Class B		STJ-47 Rendezvous Bay, NPS-23 Rendezvous Bay, VI204627 Klain Bay, VI402599 Hart Bay
VI-STJ-26	Chocolate Hole Class B		STJ-46 Chocolate Hole, NPS-24 Chocolate Hole,VI391298 Chocolate Hole
VI-STJ-27	Rendezvous Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STJ-28	Great Cruz Bay Class B		STJ-45 Great Cruz Bay. NPS-25 Great Cruz Bay, VI779192 Great Cruz Bay
VI-STJ-29	Turner Bay/Enighed Pond Class C		STJ-55 Turner Bay, NPS-26 Turner Bay
VI-STJ-30	Cruz Bay Class B		STJ-43A Cruz Bay, North, STJ-43B Cruz Bay, South, STJ-43C Cruz Bay, North of Seaplane Ramp, STJ-43D Cruz Bay Creek North, NPS-27

			Cruz Bay (ferry dock), NPS-28 Cruz Bay (airplane ramp), NPS-29 Cruz Bay (NPS dock), VI309453 Cruz Bay
VI-STJ-31	Great Cruz Bay watershed, offshore Class B		VI456779 Frank Bay
VI-STJ-32	Southwest St. John HUC14, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STJ-33	Pillsbury Sound Class B		STJ-OFF13 STJ West-4
VI-STC-01	Frederiksted, south Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-02	Frederiksted Harbor Class C		STC-28 Frederiksted Pier, STC-29 Frederiksted Public Beach, VI970611 F'sted (Fst. Target)
VI-STC-03	Lagrange subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-04	Prosperity, nearshore Class B		VI252619 Rainbow (Prosperity)
VI-STC-05	Prosperity subwatershed,		There are currently no monitoring stations within this assessment

	offshore Class B		unit.
VI-STC-06	Sprat Hall Beach Class B		STC-30 Sprat Hall Beach, VI645288 Sprat Hall
VI-STC-07	Creque Dam/Butler Bay Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-08	Hams Bay Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-09	Davis Bay Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-10	Hams Bluff Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-11	Northwest St. Croix HUC14, offshore Class B		STC-OFF1 NW-1, STC-OFF7 STC West-3
VI-STC-12	Cane Bay Class B		STC-32 Cane Bay, VI201013 Cane Bay
VI-STC-13	Baron Bluff subwatershed Class B		STC-31 Davis Bay, VI398766 Davis Bay
VI-STC-14	Belvedere Class B		There are currently no monitoring stations within this assessment unit.

VI-STC-15	Northside subwatershed Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-16	Salt River Lagoon, Marina Class B		STC-33 Salt River Marina, STC-33C Salt River Lagoon, Marina
VI-STC-17	Salt River Lagoon, Sugar Bay Class B		STC-33D Salt River Lagoon, Sugar Bay
VI-STC-18	Salt River Bay Class B		STC-33A,B,E-J Salt River (Columbus Landing Beach), VI146901 Gentle Winds, VI558328 Columbus Landing
VI-STC-19	Judith Fancy Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-20	Salt River Bay subwatershed, west Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-21	Salt River Bay subwatershed, east Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-22	Northcentral St. Croix HUC14, offshore Class B		STC-OFF4 North-2, STC-OFF11 North-4
VI-STC-23	St. Croix-By-the-Sea Class B		STC- 34 St. Croix-By-the-Sea, VI738082 Pelican Cove

VI-STC-24	Long Reef Backreef, west Class C		STC-48 Long Reef Backreef, west
VI-STC-25	Princess subwatershed, offshore Class C		STC-35 Long Reef Forereef West
VI-STC-26	Christiansted Harbor Class C		STC-37 Christiansted Harbor Entrance West, STC-40 St. Croix Marine, STC-41 Gallows Bay, STC-42 Public Wharf, STC-43 Water Gut Storm Drain, STC-44 Protestant Cay Beach, STC-45 Christiansted Harbor, STC-46 WAPA Intake, STC-47 Mill Harbor Condominium Beach, STC-49 Long Reef Back Reef East, VI572166 Condo Row (Princess), VI359239 Protestant Cay
VI-STC-27	Long Reef Forereef, east Class B		STC-36 Long Reef Forereef East, STC-35A LBJ (Pump Station) Outfall
VI-STC-28	Altona Lagoon Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-29	Christiansted Harbor, east		STC-1 Lagoon Recreational Beach ,STC-39 Altona

	Class C		Lagoon Inlet, VI213332 New Fort Louise Augusta
VI-STC-30	Beauregard Bay Class B		STC-2 Ft. Louise Augusta Beach, STC-38 Christiansted Harbour Entrance-East, VI651587 Buccaneer
VI-STC-31	Buccaneer Beach Class B		STC-3 Buccaneer Hotel
VI-STC-32	Altona Lagoon subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-33	Punnett Bay Class B		VI610321 Shoy's
VI-STC-34	Punnett Point, east Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-35	Tamarind Reef Lagoon (Southgate Lagoon) Class B		STC-4 Tamarind Reef Lagoon
VI-STC-36	Green Cay Beach Class B		VI563397 Chenay Bay Beach
VI-STC-37	Southgate subwatershed, offshore Class B		STC-5 Green Cay Beach
VI-STC-38	Solitude Backreef		There are currently no monitoring stations

	Class B		within this assessment unit.
VI-STC-39	Teague Bay Class B		STC-8 Reef Club Beach, STC-9 St. Croix Yacht Club Beach, VI381319 Teague Bay (Reef)
VI-STC-40	Teague Bay Backreef Class B		STC-10 Cramers Park, VI351774 Cramer's Park
VI-STC-41	Buck Island Backreef Class A		STC-6 Buck Island Backreef, STC-7 Buck Island Anchorage
VI-STC-42	Buck Island Forereef Class A		There are currently no monitoring stations within this assessment unit.
VI-STC-43	Solitude and Teague Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-44	Northeast St. Croix HUC14, offshore Class B		STC-OFF8 North-3
VI-STC-45	Isaac Bay Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-46	Grapetree Bay Class B		STC-11B Isaacs Bay Forereef
VI-STC-47	Turner Hole Backreef		STC-12 Grapetree Beach, VI297470

	Class B		Grapetree Beach
VI-STC-48	Turner Hole subwatershed, offshore Class B		STC-OFF5 East-2
VI-STC-49	Madam Carty Backreef Class B		STC-13B Robin Bay
VI-STC-50	Madam Carty, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-51	Great Pond Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-52	Great Pond Bay Class B		STC-13A Great Pond Bay
VI-STC-53	Great Pond Bay subwatershed, offshore Class B		STC-OFF13 SE-4
VI-STC-54	Leprey Valley Backreef Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-55	Leprey Valley subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-56	Bugby Hole Backreef Class B		STC-14A Halfpenny Bay - Manchenil, STC-14B Halfpenny Backreef, VI931289,

			Halfpenny
VI-STC-57	Bugby Hole subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-58	Southeast St. Croix HUC14, offshore Class B		STC-OFF2 SE-1, STC-OFF10 SE-3
VI-STC-59	Canegarden Bay Class B		STC-15 Canegarden Bay
VI-STC-60	Canegarden Bay, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-61	Hess Oil Virgin Islands Harbor Class C		STC-16 HOVENSA East Turning Basin, NW Corner, STC-17 HOVENSA West Turning Basin, NW Corner
VI-STC-62	Limetree Bay Class B		STC-18 Limetree Bay Container Port
VI-STC-63	Martin-Marietta Alumina Harbor Class C		STC-19 Krause Lagoon Channel, STC-20 Alumina Plant Dock
VI-STC-64	Manning Bay/Estate Anguilla Beach Class B		STC-23 Public Dump
VI-STC-65	Hovensa, west		STC-22A Treatment Plant (POTW) Outfall

	Class B		STC-21 Spoils Island (Ruth Island)
VI-STC-66	Hovensa subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-67	Southports St. Croix HUC14, offshore Class B		STC-OFF9 SW-3
VI-STC-68	Bethlehem subwatershed, inshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-69	Bethlehem subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-70	Airport, nearshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-71	Airport, offshore Class B		STC-OFF6 South-2
VI-STC-72	Airport St. Croix HUC14, offshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-73	Diamond, nearshore Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-74	Enfield Green Beach/VIRIL		There are currently no monitoring stations

	Outfall Class B		within this assessment unit.
VI-STC-75	Diamond subwatershed, offshore Class B		STC-24B Rum Plant (VI Rum) Outfall
VI-STC-76	Carlton Beach Class B		STC-25 Long Point
VI-STC-77	Long Point Bay Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-78	Long Point Bay subwatershed, offshore Class B		STC-OFF12 SW-4
VI-STC-79	Good Hope Beach Class B		STC-26 Good Hope Beach
VI-STC-80	Sandy Point, nearshore south Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-81	Sandy Point, offshore south Class B		There are currently no monitoring stations within this assessment unit.
VI-STC-82	Sandy Point, nearshore west Class B		STC-27 Sandy Point Public Beach, VI896490 Dorsch Bay, VI907985 Stony Ground
VI-STC-83	Sandy Point, offshore west		There are currently no monitoring stations within this assessment

	Class B		unit.
VI-STC-84	Southwest St. Croix HUC14, offshore Class B		STC-OFF3 SW-1

7.1. Site distribution

Sites have been selected following a judgmental design, resulting in a network of fixed monitoring stations within embayments and nearshore waters of the islands. Some sites from the original network were maintained while some have been dropped and others have been added, in accordance to need. The design targets sites of particular concern, such as point-source discharges (factory and sewage treatment-plant outfalls) for TPDES compliance, as well as non-point source pollution within harbors, marinas, landfills, and marine recreational areas.

EPA contractors sample 138 sites every quarter using a motor vessel, 55 around St. Croix, 61 around St. Thomas, and 22 around St. John (Figure 2 to 4, Appendix I for location and name of stations).

Offshore water quality is monitored following a rotating schedule. A total of 26 sites are sampled throughout the Territory on an annual basis. Each quarter, a different set of offshore stations is visited (6 to 7 stations per quarter) such that each offshore station is sampled once per year (Figure 5 and 6, Appendix II for location and name of stations). However, due to DEP's limited deep-water monitoring capabilities, offshore data collection will focus on surface sampling (top 0.5 m) only. The data collected may enable DPNR to make broad statements on the condition of offshore waterbodies.

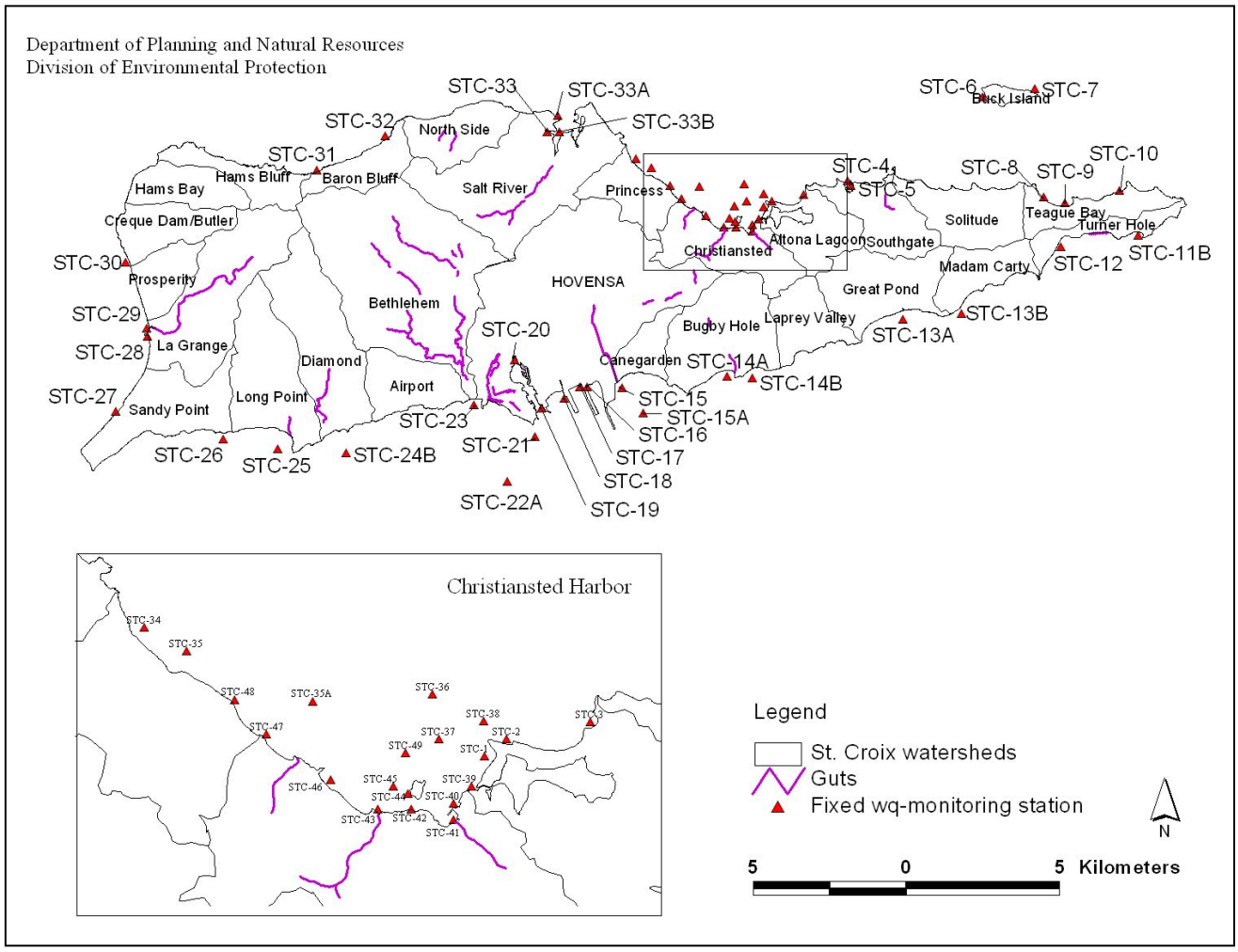


Figure 2. St. Croix's Ambient Water Quality Monitoring sites.

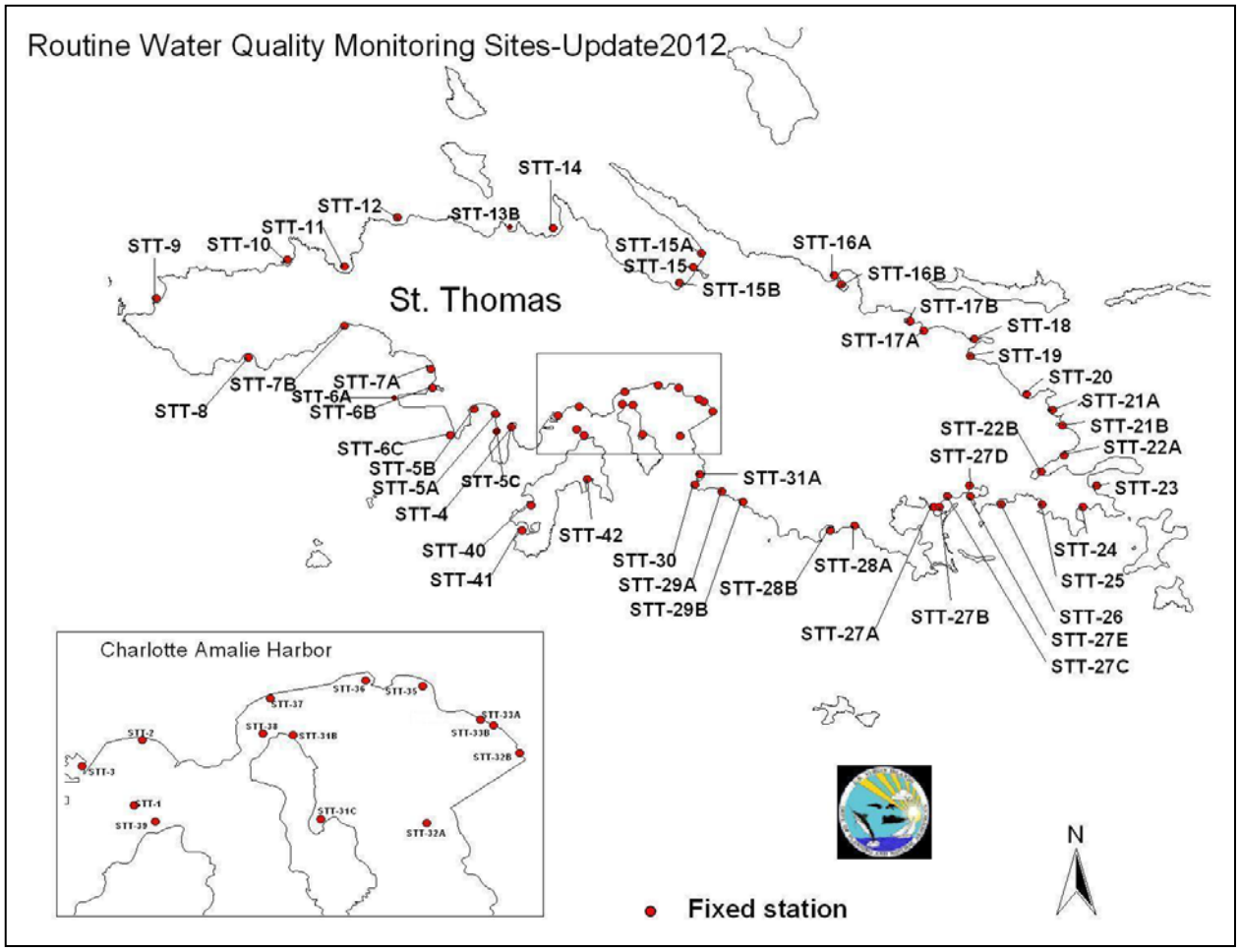


Figure 3. St. Thomas Ambient Water Quality Monitoring sites.

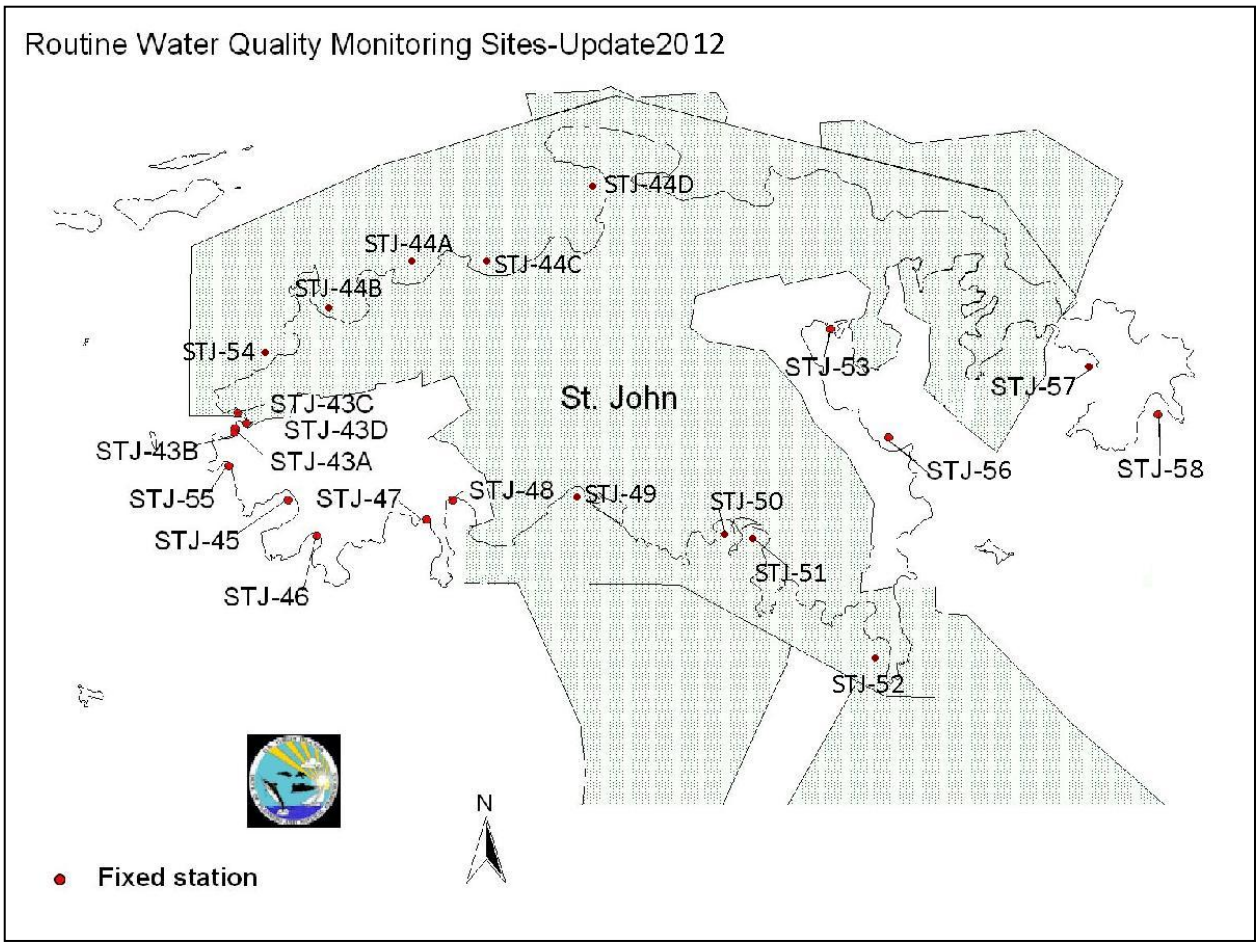


Figure 4. St. John Ambient Water Quality Monitoring sites.

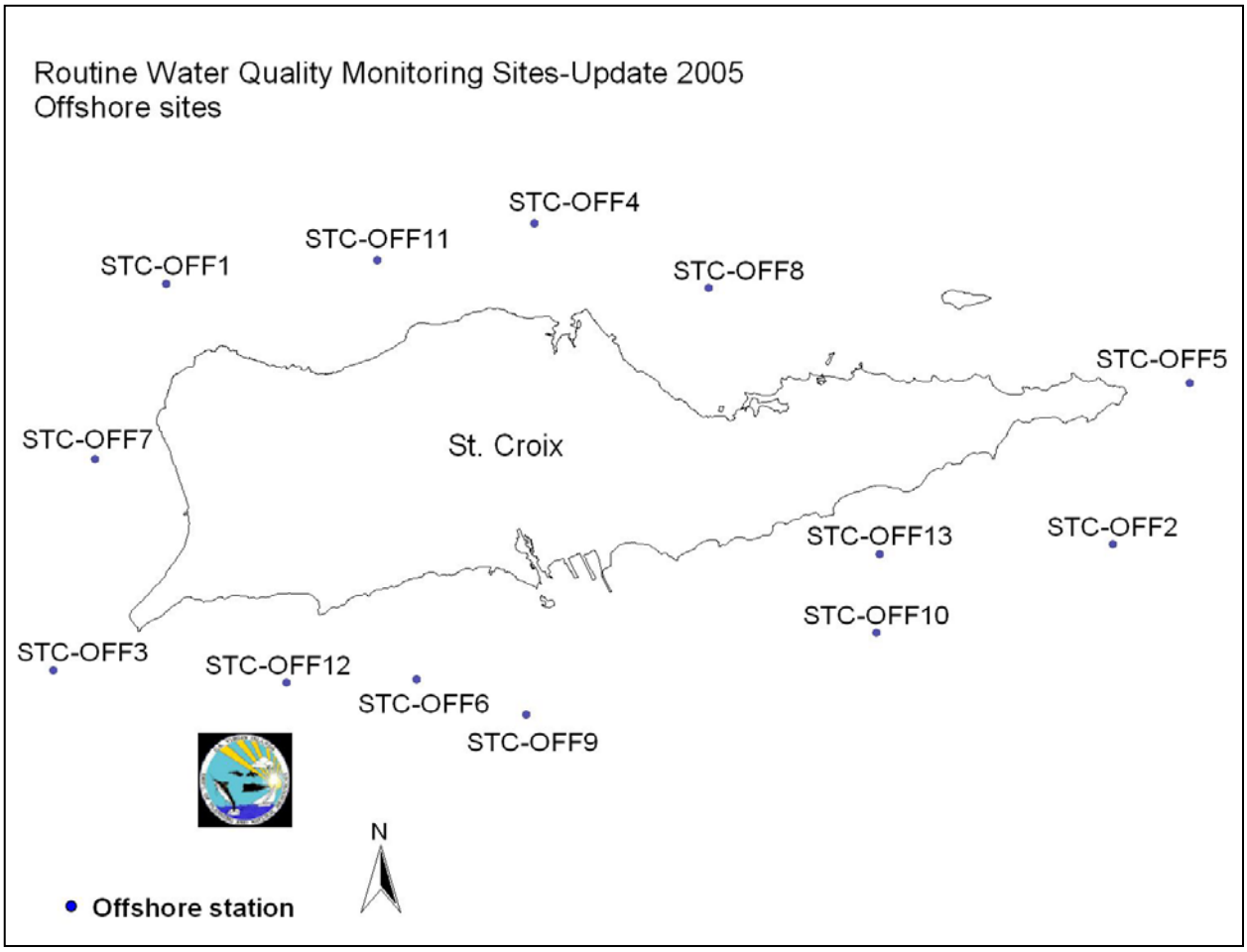


Figure 5. St. Croix sites for offshore water quality monitoring.

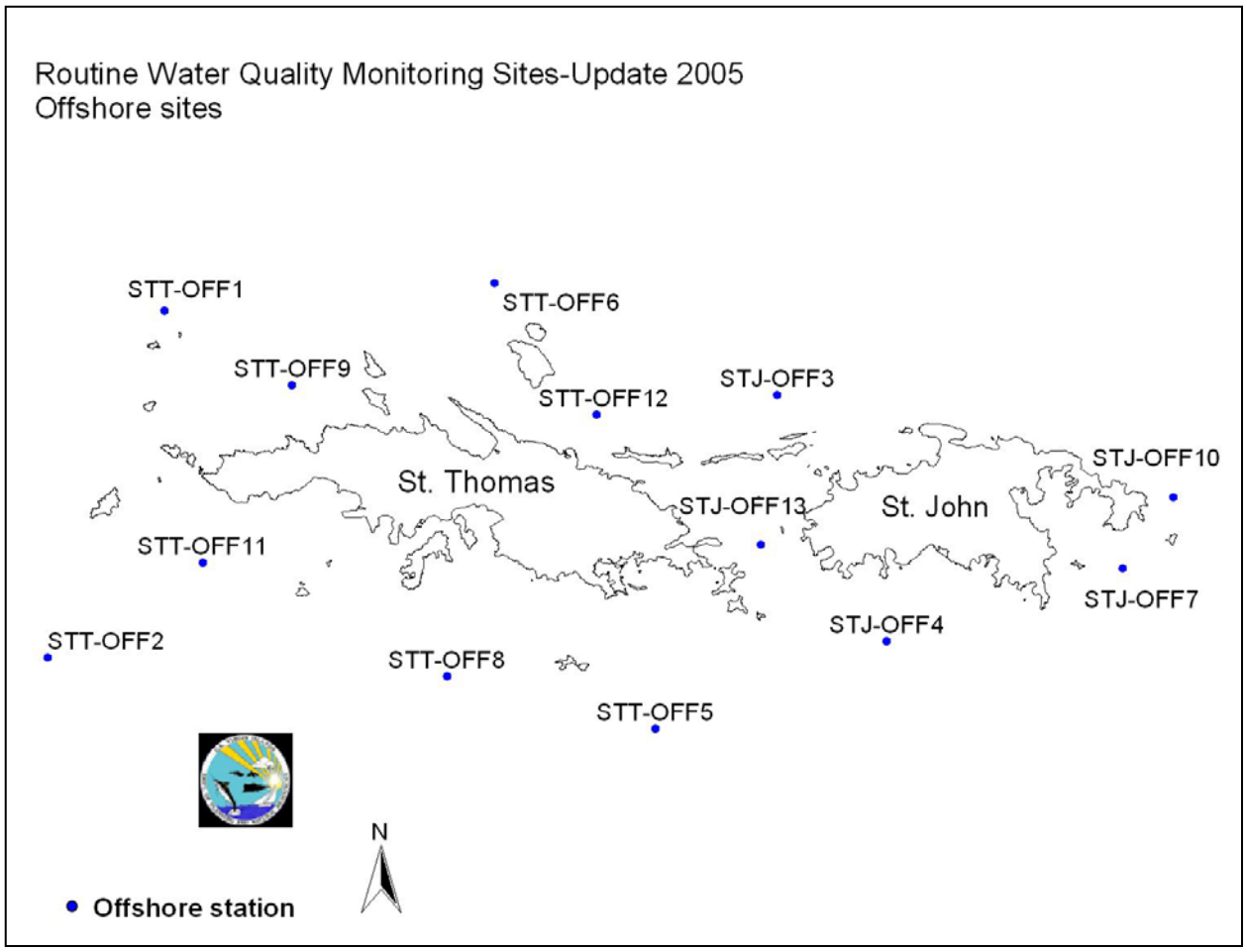


Figure 6. St. Thomas and St. John sites for offshore water quality monitoring.

7.2. Water quality parameters

At each monitoring site, water surface-samples (grab sampling) are collected and chemical and physical parameters are measured in situ using a hand-held multi-parameter water quality probe (YSI 6600 sonde) with cable connection to a deck display (Table 1). A Secchi disk measurement (transparency) is taken at sites where the bottom is not visible. Water samples are taken to a DPNR approved laboratory for analysis (see Ambient Monitoring SOP).

Grab samples are discrete, individual samples collected over a maximum of 5 minutes. Although DPNR uses such discrete measurements and samples to estimate water quality condition over a time scale of quarters (3 month intervals), it is recognized that results may apply strictly to the ambient conditions at the time the sample was taken. Quarterly sampling does not allow for an assessment of higher frequency variations in water quality (e.g. short-term elevation in turbidity caused by stormwater runoff; periodic decreases in salinity following heavy rainfall events). To better assess and define such high frequency events, multiple grab samples or YSI probe measurements can be gathered at a station, although costs increase due to additional labor and laboratory expenses. Alternatively, corroborating data can be obtained from independent data sources such as the NOAA CREWS station, which provides continuous measures for selected water quality parameters.

Table 4. Description of water quality parameters of interest, collection method, and holding times.

PARAMETER	DESCRIPTION	COLLECTION METHOD	HOLDING TIME
Temperature	A measure of the energy of molecular motion. Expressed in degrees Centigrade	In situ - YSI multi parameter meter. 0.5 m below surface and 0.5 m above bottom.	N/A
Dissolved Oxygen	The concentration of free molecular oxygen dissolved in water. Expressed in milligrams/liter (mg/L)	In situ - YSI multi parameter meter. 0.5 m below surface and 0.5 m above bottom.	N/A
Salinity	An estimate of the concentration of dissolved salts in seawater. Expressed in parts per thousand (ppt)	In situ - YSI multi parameter meter. 0.5 m below surface and 0.5 m above bottom.	N/A
pH	A measure of the concentration of hydrogen ions in the water. Ranges from 1 to 14	In situ - YSI multi parameter meter. 0.5 m below surface and 0.5 m above bottom.	N/A
Turbidity	A measure of the degree to which light is scattered by suspended particulate material and soluble colored compounds in the water. Reported as nephelometric turbidity units (NTU)	In situ - YSI multi parameter meter. 0.5 m below surface and 0.5 m above bottom.	N/A
Secchi disk depth	Provides a method for assessing the water clarity. Expressed in meters to the nearest 0.5 m	In situ - disappearance/appearance of disk	N/A
Total Suspended Solids	Indicate the amount of solids suspended in the water, whether mineral or organic. TSS yields the weight of suspended material per volume of water. Expressed in mg/L	1.0 liter grab sample near surface. Sent to an approved lab.	7 days (if sample kept at < 4°C, dark)
Enterococci	The presence of enterococci bacteria indicates that the water has been contaminated with fecal material of man or other animals. Expressed as number of colonies per 100ml	500 ml grab sample near surface. Sent to an approved lab.	6 hours when sample kept at < 4 °C, dark
Nutrients	Total Nitrogen and Total Phosphorus. Expressed in mg/L	A sampler is used to fill pre-preserved bottles to obtain pH level less than 2. Sent to an approved lab.	24 hours [28 days if acidified (pH ≤ 2.0, dark]

7.3. Field quality control (QC)

Field crew is provided with maps and lists of the names and the coordinates of latitude and longitude of the sampling locations. In most instances the sampling is conducted from a small craft and sites are located by use of the onboard navigation/GPS system or a handheld Garmin Global Positioning System (GPS). Accuracy is usually within 15 m.

It is desirable that the same individuals conduct the monitoring to ensure consistency in monitoring the same area. Sampling should require less than 15 minutes at each site. However the sampling interval may be longer due to such factors as weather, depth, and seas.

An YSI 6600 multi-parameter sonde is used to measure water quality parameters. The sonde provides instantaneous (real time) measurements that are read from a deck display unit while the probe is lowered to the sampling depth. Data are recorded onto Water Quality Field Data Sheets (Attachment 1).

Each grab sample is collected directly from the ocean into a pre labeled container (Table 4), with the exception of samples for TP and TN. As these use pre-preserved (acid) bottles, a sampling device is used instead. Bottles are immersed mouth down to avoid surface debris or scum. The sampling depth is two (2) to six (6) inches below the water surface. Sample bottles are supplied by the laboratory that will perform the analysis. If preservation involves adjusting sample pH (nutrients), the preserved sample should always be checked to make sure it is at the proper pH level before they are delivered to the lab or shipped by DEP Personnel.Shipping of samples will be required when the lab in the district that samples are taken cannot analyze the samples (whether due to lab capabilities or closure, etc.). In such a case, samplers shall deliver samples, packaged in an insulated, water-tight container, to either Seaborne or Cape Air Airlines. Chain of Custody and copies of Field sheets will need to be packaged with the samples in a water-tight enclosure. Samplers will need to confirm a flight is available that will allow delivery of samples within holding times, verify that staff is available to receive the samples in the receiving district and deliver them to the lab within holding times. Relinquish time for the samples shall be noted.

Table 5. Recommended sample container and volumes for parameters of interest.

Parameter	Recommended container	Volume
Enterococci	**Factory-sealed, pre-sterilized, disposable Whirlpool ® bags or sterile plastic (high density polyethylene or polypropylene) container**	**500 ml**
Total Suspended Solids	**Wide mouth polyethylene bottles**	**1000 ml**
Nutrients	**Pre-preserved (acid)**	**1000 ml**

bottles

Duplicate samples are taken at a frequency of one for every ten (10) samples collected for a minimum of 10 % of the total amount of samples. The location of the duplicate(s) and the time it was collected are noted on the back of the field sheet. The RPD between sample and duplicate is calculated when the lab results are received.

$$\mathbf{RPD = \{(C_1 - C_2)/ [(C_1 + C_2)/2]\} \times 100}$$

RPD= Relative Percent Difference
C_1= Larger of two observed values
C_2= Smaller of two observe values

Duplicate samples should agree by at least 30%. When unusual results are received from the laboratory, WQM staff may contact the laboratory and request a copy of the raw data or other supporting evidence. Re-sampling may be necessary. ~~In the case where sample and duplicate results show very low concentrations, an RPD of up to 200% is acceptable.~~

As there may be large difference between samples due to differences in the environment, duplicate samples shall not be taken for Entero. Instead, labs shall provide results for duplicate counts by analysts, and RPD shall be calculated as follows:

$$\mathbf{RPD = \{(C_1 - C_2)/ [(C_1 + C_2)/2]\} \times 100}$$

RPD= Relative Percent Difference
C_1= Larger of two CFU counts
C_2= Smaller of two CFU counts

Duplicate counts should agree by at least 5% for duplicate counts by the same analyst and 10% for duplicate counts by different analysts.

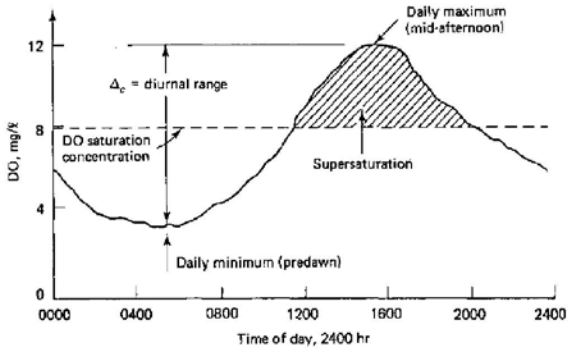
In the field, when the staff note a reading which appear abnormal, i.e. much higher or lower than normally noted (Table 5), they will check the instrumentation for calibration and/or battery charge and take another reading. If the reading is still abnormal, the back-up sonde shall be deployed and used to confirm the reading. If the reading is closer to what is expected, the back-up probe shall be used going forward, and a note made to check the first probe for issues. Staff will record any unusual circumstances under comments. Actions will be taken to replace or repair broken equipment prior to the next field use. No data will be entered into the database that were known to be collected with any faulty equipment.

Table 5. Expected range of natural variation for in situ measures of water quality parameters *

Parameter	Reason for natural variation	Natural range	Reference
Temperature (˚C)	**Seasonal**	**Winter: 26 – 29 Summer: 28- 32**	**2006 Ambient Data**
pH	**-**	**7.5 -8.4**	**Rogers et al. 1994**
Salinity (ppt)	**Affected by stormwater/groundwater**	**34 - 37**	**Rogers et al. 1994**
DO (mg/L)	**Diurnal light levels affect photosynthesis**	**Early morning low Afternoon max**	**DEP 2005**

*** Excluding Secchi depth and Turbidity**

DO is subject to natural daily and seasonal variation. DO of surface waters varies over a 24 hour period due to net oxygen production from photosynthesis of plants and algae during the day and net respiration at night (see figure at right).



The magnitude of diurnal DO fluctuation is affected by vegetation, water temperature, amount of sunlight, sea state, tidal cycles, and other factors influencing mixing or advection rates of the waters. Anthropogenic inputs (especially nutrients) may alter the natural, diurnal fluctuation pattern of DO concentration (DEP 2005).

8. Analytical requirements

All grab samples will be placed (upright) in a cooler with frozen ice packs or ice. The samples will be cooled to below 4°C (±2°C) and promptly transported to a DPNR approved laboratory within holding time unless otherwise indicated. Water sample analyses are conducted by a local laboratory or UVI's laboratory that is DPNR approved (Table 6).

Analytical and processing laboratories will retain raw data files (e.g. water quality indicator/contaminant, instrument calibration and quality control checks, sampling handling and processing logs, etc.) for a minimum of four (4) years. DPNR/EPA will retain the authority to access the files or request copies of specific information, as they deem necessary.

Table 6. Analytical laboratories and their corresponding shipping addresses.

Parameter	Laboratory/Coordinator	Address
Bacteria and TSS	**Ocean Systems Laboratory, Inc.** **Amy Dempsey** **Ph: (340) 718-3246 FAX: 773-6829** **Ph: (340) 714-1911 FAX: 773-6829**	**4049 LaGrande Princesse** **St. Croix, VI 00820-4318** **6194 Estate Frydenhoj #43** **St. Thomas, VI 00802**
Bacteria, TSS & Nutrients	**MacLean Marine Science Center** **Paul Jobsis** **Ph: (340) 693-1384**	**#2 John Brewer's Bay** **St. Thomas, VI 00802**

Ocean Systems Laboratory is equipped to perform bacteriological analysis and the MacLean Marine Science Center is equipped to perform bacteriological as well as nutrient analysis. These laboratories are subject to Performance Audit Inspections (PAI) to ensure good practices. Laboratories must document the methods they use, the SOPs, and the data acceptability criteria of their analytical capabilities in their QA Program Plan and QA Manual respectively, also.

The laboratory supervisor of each lab has primary responsibility for responding to a failure of analytical systems. The methods used to analyze water samples are summarized in Table 7.

Table 7. Laboratory methods used to analyze water samples.

Method	Description	Laboratory
1600	**Membrane filtration method for the determination of enterococci in Water**	**Ocean Systems**
IDEXX - ENTEROLERT	**24-Hour detection of Enterococci**	**UVI**
Method 2540D, 21st Edition	**Total Suspended Solids**	**UVI Ocean Systems**
2130-B	**Turbidity**	**UVI Ocean Systems**
	Nitrogen, Total Persulfate Digestion	**UVI Ocean Systems**
365.4	**Phosphorus, Total Persulfate Digestion**	**UVI Ocean Systems**

All samples remaining after successful completion of analyses will be disposed of properly. It is the responsibility of the personnel of each analytical laboratory to ensure that all applicable regulations are followed in the disposal of samples or related chemicals.

9. Sample handling and custody requirements

It will be required that each activity, both field measurements and laboratory analyses, be thoroughly documented in accordance with the following guidelines:

9.1. Field activities

Field crew will rely primarily upon hardcopy field forms to record most data collected. Raw data is recorded by ballpoint pen on a real-time basis. Any corrections or revisions will be made by lining through the original entry and initialing the change. An example water-quality field data sheet is provided (Attachment 1).

Data sheets will be filed in the DPNR-DEP office at the completion of the field activities. The file will include:

a) A short memorandum describing the monitoring activities
b) Laboratory results
c) Chain of custody forms
d) Field data sheets

All data recorded on field data sheets will be transcribed into an electronic format within a reasonable time following collection (target period, within a month). To ensure consistency, it is preferable that one person be responsible for data entry.

After entry is complete, a minimum of 10 % of the entered data is reviewed for entry accuracy. If any discrepancies are found, the entire data set should be reviewed and corrected. After this data review process is completed the data shall be uploaded from the local computer to the database coordinator for batch update to the EPA Storage and Retrieval of Water-Related Data (STORET) data warehouse (See WQX_Web Data Entry SOP).

9.2. Sample tracking

A systematic approach for sample tracking was developed to ensure accountability for the handling, storage, and transfer or shipment of the field collected samples. Chain-of-custody documentation (COC) is required. Every transfer of custody will be noted and signed for on the COC. An example of a COC form is provided (Attachment 2).

Field data sheets and custody documents will be used by field personnel to record all aspects of sample collection and handling, visual observations and field measurements.

Handling should be as follows:

a) *Copies* of the field data sheets and *original* COC forms will be transferred with the samples.

b) *Original* field data sheets and *copies* of COC forms will be retained by DPNR.

The recipient of the samples (processing laboratory) will inventory the physical samples against the COC. If a sample is missing, the laboratory should then go through appropriate channels to contact the field team as soon as possible so that they may attempt to locate the sample or re-sample if necessary.

9.3. Sample packaging and shipping procedures

When packaging samples the following procedure must be followed.

- Labels will be affixed to each sample container (vinyl duct tape is being used since is not affected by the water in the cooler). Each label will include at minimum the station identification number. When sample labels cannot be used, the information specified above must be written on the container with permanent marker.

- All lids/caps must be checked to make sure they are tight and do not leak.

- All samples that need to be kept cold (below 4°C) have been cooled prior to packaging and shipping. To ship samples cold, place double-bagged ice around and on top of sample containers. Do not pour loose ice into the coolers when shipping samples.

- Use a clean waterproof metal or plastic ice chest or cooler for shipping the samples. Remove inapplicable shipping labels. Close and seal all drain plugs inside and outside the cooler with duct tape or strapping tape.

- Enclose all sample documentation (i.e., COC, field data sheets, cooler return shipping documents, etc.) in a water-proof plastic bag and tape the bag to the underside of the cooler lid.

- Enclosed documentation should address all the samples in the cooler. When more than one cooler is used, each cooler should contain the appropriate documentation for the samples in each cooler.

- Inside the cooler lid write the organization and return address of where the cooler should be returned in permanent ink.

- Tape the cooler shut using strapping tape over the hinges and around the entire cooler. Place completed custody seals across the top and sides of the cooler lids so that the lid cannot be opened without breaking the seal.

- Place clear tape over the seal to prevent inadvertent damage to the seal during shipment.

- Inter-island shipments will be shipped via Seaborne or Cape air.

10. Maintenance and calibration requirements

Both field and laboratory equipment and instruments require routine calibration checks to verify that their performance is within acceptable quality standards.

FIELD CALIBRATIONS

To ensure that field measurements meet quality standards, instruments are calibrated to re-establish acceptable levels of performance. Calibration and maintenance procedures are described in detail in the YSI operating manual and DEP's YSI 6600 Sonde Operation and Maintenance SOP. The YSI 6600 multi-parameter sonde is calibrated and tested prior to data collection following the YSI 6600 Sonde Operation and Maintenance SOP. Calibrations are recorded on Calibration Worksheets (Appendix A – YSI 6600 Sonde Operation and Maintenance SOP) which are 3-hole punched and stored in 3-ring binders in each district. An Inventory Log (Appendix B – YSI 6600 Sonde Operation and Maintenance SOP) of when calibration solutions are received, opened, expire and discarded are also keep in either district.

A functional GPS system provides accurate positioning data. The units have a signal strength display that indicated the degree of accuracy at which the unit is currently performing.

LABORATORY CALIBRATIONS

General laboratory equipment is required to have some documentation of performance. Each piece of equipment should have an assigned logbook in which the calibration or performance records are maintained.

Specific types of containers will be used throughout the surveys. All containers for grab samples will be provided by the analytical laboratories, readied for sampling according to the laboratory's protocol.

FIELD EQUIPMENT MAINTENANCE

The Department's YSI 6600 Multi-parameter Sonde will be maintained in accordance with the manufacture's specifications and the YSI 6600 Sonde Operation and Maintenance SOP.

11. Data management

All raw data are stored in DEP offices. WQM staff evaluates the data received from the analytic labs and stores them along with the field data sheets. Files are organized by quarter year and island (St. Croix and St. Thomas-St. John) (also see Filing of ambient data SOP). Data is manually entered into MS Excel via the WQX_Web Template.

Data entry will be verified for errors of transcription by double checking ~10% of the data against the hardcopy datasheets. Six entries from St. Croix data and 8 from St. Thomas-St. John data will be randomly selected per quarter. If an error is identified, the complete data set will be checked.

Use the random number table (Appendix III) to select the data to be checked. A maximum of 77 data points will be collected per quarter per district. To use the table:

- Select which two digits, which direction, and drop your pencil (eyes closed) for a starting point.
- Are the two digits that you selected between 01 and 77?
- If yes, that's your first sample element.
- If not, keep going in the preset direction until you find such a number.
- Write it down.
- Then, go back to the random number table, continuing to move in the preset direction until you find the next number between 01 and 77. That is your second element. And so on.

All data verification is recorded in a logbook (located in both offices) with permanent ink. After this data review process is complete the data shall be uploaded from the local computer to the Water Quality Exchange (also see WQX_Web Data Entry SOP).

12. Assessments/oversight

Any changes to the procedures described in this QAPP or the attached documents, and/or any corrective actions will be documented and approved by the Program Manager and QA officer.

QA activities include technical audits, file audits, and reviews of documents related to data collection and management. The assessment and response section of the QMP provides corrective action details for DEP, and also addresses corrective action for extramural activities such as project audits and records review. On-going assessment of field data and sample collection activities will be review and assessed to determine the need for corrective action (if any).

Every laboratory coordinator must inform the Program Manager and the QA officer of any deviations from the analytical methodology specified in this QAPP or of any significant analytical problems encountered. Corrective actions may be necessary during data collection. The following are some common scenarios:

- A field real-time reading seems out of range. A new reading will be taken and if appropriated a field calibration (dissolved oxygen) will be performed before repeating deployment of the sonde or the back-up sonde shall be deployed to confirm the reading. If the reading is different (and seems to be in expected range) the back-up sonde shall be used until the other sonde can be checked or calibrated again. The sampling team shall note on the field data sheets which monitoring stations were sampled with the back-up sonde.
- A monitoring/sampling station is changed due to bad field conditions at the time of the survey. The sampling team will note the changes on the field data sheets and the sample/data will be collected from a nearby location that has similar characteristics (e.g. depth, bottom composition, associated land).
- Sample's holding time is violated. The sample will be invalidated and a re-visit will be scheduled.
- A problem arises during the laboratory analysis. The QA officer and the PM will be notified. Corrective action will be conducted in accordance with the laboratory's protocols, QAPP and analytical method when and if required.
- Quality control sample disagree by more than 30%. The sample set for that duplicate may be invalidated and a re-visit will probably have to be scheduled. In the case where sample and duplicate results show very low concentrations, an RPD of up to 200% is acceptable.
- Discrepancies are found after data has been entered. Two staff members shall review the entire data set together and correct any inaccurate entries.

A summary report shall be generated after each sampling event, detailing all corrective actions taken during the event, and reviewed by the Program Manager and QA/QC officer to verify correct steps were taken.

13. Data review, verification and validation

Conditions of water quality are evaluated at each station by comparing data to their water quality standard. Water quality standards include narrative and numeric criteria that support the designated uses.

STORET now WQX has been implemented (1996 305(b)) in the USVI and is managed under the Water Quality Management Program. All data are systematically transferred into an electronic version and ultimately into STORET/WQX. In addition, the attainment status for each assessment unit is evaluated using the Assessment Database (ADB).

The data will be used for the following:

1) To support the water quality standards program
2) To support TPDES permit re-issuance and/or revision
3) As baseline information for use in possible enforcement actions
4) Public information
5) To insure that all water bodies meet their designated use as given in the VI Code.

The data generated during Ambient Monitoring is systematically reviewed with varying levels of scrutiny at several occasions along the path from time of collection to final reporting; from quick, on-the-spot screening to in-depth evaluation against established criteria or standards. For much of the field collected data, the first level of validation will occur as data are recorded; persons conducting and documenting real time observations should be aware of the range that constitutes realistic values for a specific measure (see Table 3). Re-run of any suspicious readings should be performed immediately after it has been detected.

Laboratory analyses will be monitored by a series of QC checks that indicate the general level of data quality for a given batch of samples. The laboratory will produce a validated data report.

14. Reconciliation with user requirements

These data will be analyzed and used by DPNR for water quality assessments, TMDL development, permit decisions, and numerous other purposes. There are several ways data may be evaluated and reported.

Typically, DEP requires the comparison of ambient measurements to established water quality standard criteria. This allows regulators to identify waterbodies where pollution controls may be needed as well as to determine the effectiveness of controls already in place. These same data will be eventually used for comparative analyses of data between stations and over time, and to characterize water quality conditions.

15. Data reporting

The USVI Integrated Water Quality Monitoring and Assessment Report (CWA 305(b)/303(d)) is the primary document used to report the results.

Section 303(d) of the Clean Water Act requires Territories to develop lists of all waterbodies for which technology-based effluent limitations required by Section 301 are not rigorous enough to attain and maintain applicable water quality standards (impaired). For these priority waters, TMDL development will be scheduled for pollutants causing impairment of those waterbodies. The list of impaired waterbodies and TMDLs must be submitted to EPA.

Once the information has been compiled and evaluated, the waterbodies can be classified into one of the following categories:

Category 1
The assessment unit is placed in this category if it meets the water quality standards for the parameters that define support for both Primary Contact Recreation (PCR) & Aquatic Life Use Support (ALUS).

Category 2
The assessment unit is placed in this category if it attains water quality standards for the parameters that define support for either PCR or ALUS but not all uses are supported.

Category 3
The assessment unit is placed it this category if insufficient or no data is available to determine if water quality standards are attained and any designated uses are supported. The Virgin Islands considers insufficient data as anything less than four quarters of monitoring data. However, waters with less than four quarters of monitoring data may be reviewed on a case-by-case basis if the limited data strongly suggests that water quality standards are exceeded and the designated uses are impaired. Such waters may be eligible for inclusion on the 303(d) List. Remaining waters with insufficient data will be scheduled for more extensive monitoring in the USVI's multi-year monitoring schedule.

Category 3A
No data is available from any of the identified data sources for the assessment unit in question.

Category 3B
Insufficient Data is available from any of the identified data sources for the assessment unit in question. Insufficient data is defined as less than four quarters of monitoring data. This category differs from Category 2 in that this condition must apply to all designated uses.

Category 3C

Inconclusive Data is available from any of the identified data sources for the assessment unit in question. This might include information from studies that do not directly provide information related to water quality standards.

Category 3D
Unreliable or low quality data is available from any of the identified data sources for the assessment unit in question. Unreliable or low quality data is defined as data sets that have significant gaps, obvious anomalies, etc.

Category 4
Assessment units that are found to be partially or not supporting for one or both designated uses are place in category 4 under the appropriate subcategory (4A, 4B, 4C), but TMDL is not needed.

Category 4A
The assessment unit is placed in this category if it was previously listed on the 303(d) list and a total maximum daily load has been established and approved by EPA.

Category 4B
The assessment unit is placed into this category only if other pollution control requirements are expected to address all water-pollutant combinations and attain all water quality standards within a reasonable period of time. The Virgin Islands considers a reasonable period of time as being the time between reporting cycles. If the impairment is the result of a point source discharge, is expected that the Territorial Pollution Discharge Elimination System (TPDES) program will take appropriate measures to control point source pollution. If the impairment is the result of non-point source pollution, DPNR will provide evidence that a pollution control measure is in place.

Category 4C
The assessment unit is placed into this category if the impairment was not caused by a pollutant, but instead is caused by other types of pollution. Assessment Units placed in Category 4C do not require the development of a TMDL. Pollution, as defined by the CWA is “the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water” (section 502(19)). In some cases, the pollution is caused by the presence of a pollutant and a TMDL is required. In other cases, pollution does not result from a pollutant and a TMDL is not required. These assessment units should be scheduled for monitoring to confirm that there continues to be no pollutant associated with the failure to meet the water quality standard and to support water quality management actions necessary to address the cause(s) of the impairment.

Category 5
The assessment unit is placed into this category if water quality standards are exceeded in which case a total maximum daily load must be established. Assessment units that are placed into Category 5 will be placed on the 303(d) Total Maximum Daily Load List for the applicable reporting cycle.

16. References

Battelle 2003. Delineation of Coastal Waterbodies in the U.S. Virgin Islands. EPA Contract No. 68-00-121 Work Assignment No. 2-41. Final Summary Report. 77 pp.plus maps.

Crawford, C. (in prep). A proposed delineation of U.S. Virgin Islands Coastal Waters. Department of Planning and Natural Resources, Division of Environmental Protection.

DEP 2005. Dissolved oxygen TMDL for Vessup Bay and Red Hook Bay, St. Thomas, U.S. Virgin Islands. Final Draft, September 20, 2006. Prepared in part by Battelle under EPA contract Contract No. 68-C-03-041, Work Assignment No. 2-17. Department of Planning and Natural Resources, Division of Environmental Protection. 58 pp.

EPA 1999. Introduction to Water Quality Standards. Office of Water. EPA-823-F-99-020. 38 pp.

EPA 2004. Guidance for the Development of quality assurance project plans for environmental monitoring projects. Air and Water Quality Assurance Team. Revision No. 1. 17 pp.

Rogers, C., G. Garrison, R. Grober, Z. Hillis, M. Franke. 2001. Coral Reef Monitoring Manual for the Caribbean and Western Atlantic. National Park Service, St. John, U.S. Virgin Islands. Unpag.

Appendices

Appendix I. Ambient Quality Monitoring Stations

St. Croix

Station	Name	Longitude	Latitude
STC-1	Lagoon Recreation Beach	-64.69495	17.75348
STC-2	Ft. Louise Augusta Beach	-64.69245	17.75537
STC-3	Buccaneer Hotel	-64.68282	17.75733
STC-4	Tamarind Reef Lagoon	-64.66929	17.76152
STC-5	Green Cay Marina	-64.66830	17.75997
STC-6	Buck Island Beach	-64.62809	17.78661
STC-7	Buck Island Anchorage	-64.61185	17.78898
STC-8	Reef Club Beach	-64.60885	17.75715
STC-9	St. Croix Yacht Club Beach	-64.60233	17.75565
STC-10	Cramer Park	-64.58558	17.75935
STC-11B	Jack Bay, Forereef	-64.57990	17.74613
STC-12	Divi (Turner Hole Beach)	-64.60364	17.74255
STC-13A	Great Pond	-64.65193	17.72090
STC-13B	Robin Bay	-64.63396	17.72259
STC-14A	Manchenil Bay	-64.70581	17.70361
STC-14B	Halfpenny Backreef	-64.69811	17.70323
STC-15	Canegarden Bay (gut)	-64.73813	17.69993
STC-15A	Canegarden Bay	-64.73153	17.69270
STC-16	HOVENSA East Turning Basin, NW Corner	-64.74868	17.70010
STC-17	HOVENSA West Turning Basin, NE Corner	-64.75098	17.70000
STC-18	Limetree Bay Container Port	-64.75582	17.69658
STC-19	Krause Lagoon Channel	-64.76279	17.69368
STC-20	Alumina Plant Dock	-64.77120	17.70788
STC-21	Spoils Island (Ruth Island)	-64.76471	17.68545
STC-22A	Treatment Plant (POTW) Outfall	-64.77294	17.67218
STC-23	Public Dump	-64.78365	17.69459
STC-24B	Rum Plant (VI Rum) Outfall	-64.82256	17.67998
STC-25	Long Point Bay	-64.84381	17.68090
STC-26	Good Hope Beach	-64.86057	17.68375
STC-27	Frederiksted Public Pool	-64.89368	17.69158
STC-28	Frederiksted Pier	-64.88415	17.71382
STC-29	Frederiksted Public Beach	-64.88443	17.71620
STC-30	Sprat Hall Beach	-64.89095	17.73560
STC-31	Davis Bay	-64.83249	17.76322
STC-32	Cane Bay	-64.81166	17.77334
STC-33	Salt River Marina	-64.76183	17.77517
STC-33A	Salt River (Columbus Landing Beach)	-64.75860	17.77992
STC-33B	Salt River Bay	-64.75800	17.77513

STC-34	**St. Croix by the Sea**	**-64.73452**	**17.76739**
STC-35	**Long Reef Forereef West**	**-64.72960**	**17.76478**
STC-35A	**LBJ (Pump Station) Outfall**	**-64.71495**	**17.75938**
STC-36	**Long Reef Forereef East**	**-64.70103**	**17.76028**
STC-37	**Christiansted Harbor Entrance West**	**-64.70028**	**17.75532**
STC-38	**Christiansted Harbor Entrance East**	**-64.69515**	**17.75737**
STC-39	**Altona Lagoon Inlet**	**-64.69648**	**17.75008**
STC-40	**St. Croix Marine**	**-64.69848**	**17.74822**
STC-41	**Gallows Bay**	**-64.69850**	**17.74638**
STC-42	**Public Wharf**	**-64.70342**	**17.74752**
STC-43	**Water Gut Storm Drain**	**-64.70730**	**17.74746**
STC-44	**Protestant Cay Beach**	**-64.70378**	**17.74927**
STC-45	**Christiansted Harbor**	**-64.70547**	**17.75003**
STC-46	**WAPA Intake**	**-64.71278**	**17.75073**
STC-47	**Mill Harbor Condominium Beach**	**-64.72023**	**17.75565**
STC-48	**Long Reef Back Reef West**	**-64.72392**	**17.75947**
STC-49	**Long Reef Back Reef East**	**-64.70412**	**17.75378**
	Total number of stations	**55**	

St. Thomas

Station	Name	Longitude	Latitude
STT-1	Crown Bay, Near Outfall	-64.94776	18.33111
STT-2	Crown Bay, Near Tamarind Outlet	-64.94726	18.33566
STT-3	Subbase	-64.95159	18.33380
STT-4	Krum Bay	-64.96107	18.33153
STT-5A	Lindbergh Bay, East	-64.96445	18.33398
STT-5B	Lindbergh Bay, West	-64.96876	18.33489
STT-5C	Lindbergh Bay		
STT-6A	Off Airport Runway		
STT-6B	Airport College Cove	-64.97739	18.33901
STT-6C	S.W. Road, Near Red Point Outfall	-64.97360	18.32986
STT-7A	Brewers Bay	-64.97777	18.34269
STT-7B	Perseverance Bay	-64.99552	18.35088
STT-8	Fortuna Bay	-65.01508	18.34450
STT-9	Botany Bay	-65.03408	18.35598
STT-10	Stumpy Bay	-65.00742	18.36370
STT-11	Santa Maria Bay	-64.99564	18.36255
STT-12	Caret Bay	-64.98492	18.37215
STT-13	Neltjeberg Bay (Removed FY12)		
STT-14	Hull Bay	-64.95313	18.37043
STT-15	Magen's Bay	-64.92428	18.36310
STT-15A	Magen's Bay, N. E.	-64.92270	18.36587
STT-15B	Magen's Bay, NW	-64.92708	18.36005
STT-16A	Mandahl Bay	-64.89542	18.36187
STT-16B	Mandahl Bay Entrance	-64.89390	18.36013
STT-17A	Spring Bay	-64.87686	18.35122
STT-17B	Sunsi Bay	-64.87985	18.35306
STT-18	Coki Point Bay	-64.86660	18.34968
STT-19	Water Bay	-64.86728	18.34635
STT-20	Smith Bay	-64.85573	18.33895
STT-21A	St. John Bay	-64.85042	18.33600
STT-21B	Red Bay	-64.84828	18.33295
STT-22A	Red Hook Bay	-64.84790	18.32701
STT-22B	Vessup Bay	-64.85264	18.32385
STT-23	Great Bay	-64.84121	18.32122
STT-24	Cowpet Bay	-64.84395	18.31712
STT-25	Nazareth Bay	-64.85232	18.31743
STT-26	Benner Bay	-64.86070	18.31742
STT-27A	Mangrove Lagoon, Near Treatment Plant	-64.87461	18.31676
STT-27B	Mangrove Lagoon, Off Sanitary Landfill	-64.87332	18.31677
STT-27C	Mangrove Lagoon, Near Tropical Marine Fuel Dock	-64.87180	18.31879
STT-27D	Mangrove Lagoon, Near Lavida Marina	-64.86718	18.32094
STT-27E	Mangrove Lagoon, Near Compass Point	-64.86707	18.31884
STT-28A	Bovoni Bay	-64.89061	18.31288

STT-28B	**Bolongo Bay**	**-64.89560**	**18.31196**
STT-29A	**Frenchman's Bay**	**-64.91794**	**18.31939**
STT-29B	**Limetree**	**-64.91362**	**18.31733**
STT-30	**Morning Star Bay**	**-64.92349**	**18.32052**
STT-31A	**Flamboyant Cove**	**-64.92251**	**18.32264**
STT-31B	**Hassel Island, Off Navy Dock**	**-64.93636**	**18.33610**
STT-31C	**Hassel Island, Careening Cove**	**-64.93426**	**18.33031**
STT-32A	**Long Bay, Near South Dolphin**	**-64.92663**	**18.33010**
STT-32B	**Long Bay, Northeast Corner**	**-64.91995**	**18.33499**
STT-33A	**Long Bay, Off Outfall**	**-64.92186**	**18.33688**
STT-33B	**Long Bay, Off Outfall**	**-64.92277**	**18.33730**
STT-35	**Groden Bay**	**-64.92701**	**18.33955**
STT-36	**St. Thomas Harbor, North of CG Dock**	**-64.93116**	**18.33991**
STT-37	**St. Thomas Harbor, Cay Bay**	**-64.93800**	**18.33859**
STT-38	**Haulover Cut**	**-64.93852**	**18.33620**
STT-39	**Water Isle, East Gregorie Channel**	**-64.94623**	**18.33001**
STT-40	**Water Isle Hotel, Beach**	**-64.95688**	**18.31622**
STT-41	**Water Island Flamingo Bay**	**-64.95864**	**18.31135**
STT-42	**Water Island Sprat Bay**	**-64.94545**	**18.32145**
	Total number of stations	**61**	

St. John

Station	Name	Longitude	Latitude
STJ-43A	Cruz Bay, North	-64.79585	18.33181
STJ-43B	Cruz Bay, South	-64.79601	18.33120
STJ-43C	Cruz Bay, North of Seaplane Ramp	-64.79554	18.33388
STJ-43D	Cruz Bay Creek North	-64.79430	18.33244
STJ-44A	Trunk Bay	-64.77000	18.35202
STJ-44B	Hawksnest Bay	-64.77972	18.34722
STJ-44C	Cinnamon Bay	-64.75787	18.35342
STJ-44D	Francis Bay	-64.74493	18.36542
STJ-45	Great Cruz Bay	-64.78827	18.32219
STJ-46	Chocolate Hole	-64.78417	18.31740
STJ-47	Rendezvous Bay	-64.76868	18.31973
STJ-48	Fish Bay	-64.75025	18.31675
STJ-49	Genti Bay	-64.74680	18.32302
STJ-50	Little Lameshur Bay	-64.72672	18.31870
STJ-51	Great Lameshur Bay	-64.72382	18.31865
STJ-52	Salt Pond Bay	-64.70582	18.30863
STJ-53	Coral Harbor	-64.71199	18.34595
STJ-54	Caneel Bay	-64.78725	18.34273
STJ-55	Turner Bay	-64.79672	18.32665
STJ-56	Johnson Bay	-64.70368	18.33137
STJ-57	Round Bay	-64.67540	18.34111
STJ-58	Privateer Bay	-64.66562	18.33481
	Total number of stations	22	

Appendix II. Offshore Water Quality Monitoring Stations

St. Croix

Station	Longitude	Latitude	Quarter
STC-OFF1	-64.89114	17.79210	1
STC-OFF2	-64.56970	17.70364	1
STC-OFF3	-64.92943	17.66099	1
STC-OFF4	-64.76621	17.81274	2
STC-OFF5	-64.54338	17.75840	2
STC-OFF6	-64.80621	17.65793	2
STC-OFF7	-64.91523	17.73267	3
STC-OFF8	-64.70700	17.79056	3
STC-OFF9	-64.76875	17.64576	3
STC-OFF10	-64.65002	17.67364	3
STC-OFF11	-64.81935	17.79999	4
STC-OFF12	-64.85022	17.65677	4
STC-OFF13	-64.64891	17.70044	4
	Total number of stations		13

St. Thomas-St. John

Station	Longitude	Latitude	Quarter
STT-OFF1	-65.05578	18.41817	1
STT-OFF2	-65.10275	18.27874	1
STJ-OFF3	-64.80922	18.38441	1
STJ-OFF4	-64.76519	18.28534	1
STT-OFF5	-64.85838	18.25012	2
STT-OFF6	-64.92296	18.42917	2
STJ-OFF7	-64.67052	18.31470	2
STT-OFF8	-64.94204	18.27140	3
STT-OFF9	-65.00442	18.38808	3
STJ-OFF10	-64.64998	18.34332	3
STT-OFF11	-65.04037	18.31690	4
STT-OFF12	-64.88187	18.37634	4
STJ-OFF13	-64.81582	18.32424	4
	Total number of stations		13

Appendix III. Random Number Table

39634	**62349**	**74088**	**65564**	**16379**	**19713**	**39153**	**69459**	**17986**	**24537**
14595	**35050**	**40469**	**27478**	**44526**	**67331**	**93365**	**54526**	**22356**	**93208**
30734	**71571**	**83722**	**79712**	**25775**	**65178**	**07763**	**82928**	**31131**	**30196**
64628	**89126**	**91254**	**24090**	**25752**	**03091**	**39411**	**73146**	**06089**	**15630**
42831	**95113**	**43511**	**42082**	**15140**	**34733**	**68076**	**18292**	**69486**	**80468**
80583	**70361**	**41047**	**26792**	**78466**	**03395**	**17635**	**09697**	**82447**	**31405**
00209	**90404**	**99457**	**72570**	**42194**	**49043**	**24330**	**14939**	**09865**	**45906**
05409	**20830**	**01911**	**60767**	**55248**	**79253**	**12317**	**84120**	**77772**	**50103**
95836	**22530**	**91785**	**80210**	**34361**	**52228**	**33869**	**94332**	**83868**	**61672**
65358	**70469**	**87149**	**89509**	**72176**	**18103**	**55169**	**79954**	**72002**	**20582**
72249	**04037**	**36192**	**40221**	**14918**	**53437**	**60571**	**40995**	**55006**	**10694**
41692	**40581**	**93050**	**48734**	**34652**	**41577**	**04631**	**49184**	**39295**	**81776**
61885	**50796**	**96822**	**82002**	**07973**	**52925**	**75467**	**86013**	**98072**	**91942**
48917	**48129**	**48624**	**48248**	**91465**	**54898**	**61220**	**18721**	**67387**	**66575**
88378	**84299**	**12193**	**03785**	**49314**	**39761**	**99132**	**28775**	**45276**	**91816**
77800	**25734**	**09801**	**92087**	**02955**	**12872**	**89848**	**48579**	**06028**	**13827**
24028	**03405**	**01178**	**06316**	**81916**	**40170**	**53665**	**87202**	**88638**	**47121**
86558	**84750**	**43994**	**01760**	**96205**	**27937**	**45416**	**71964**	**52261**	**30781**
78545	**49201**	**05329**	**14182**	**10971**	**90472**	**44682**	**39304**	**19819**	**55799**
14969	**64623**	**82780**	**35686**	**30941**	**14622**	**04126**	**25498**	**95452**	**63937**
58697	**31973**	**06303**	**94202**	**62287**	**56164**	**79157**	**98375**	**24558**	**99241**
38449	**46438**	**91579**	**01907**	**72146**	**05764**	**22400**	**94490**	**49833**	**09258**
62134	**87244**	**73348**	**80114**	**78490**	**64735**	**31010**	**66975**	**28652**	**36166**
72749	**13347**	**65030**	**26128**	**49067**	**27904**	**49953**	**74674**	**94617**	**13317**
81638	**36566**	**42709**	**33717**	**59943**	**12027**	**46547**	**61303**	**46699**	**76243**
46574	**79670**	**10342**	**89543**	**75030**	**23428**	**29541**	**32501**	**89422**	**87474**
11873	**57196**	**32209**	**67663**	**07990**	**12288**	**59245**	**83638**	**23642**	**61715**
13862	**72778**	**09949**	**23096**	**01791**	**19472**	**14634**	**31690**	**36602**	**62943**
08312	**27886**	**82321**	**28666**	**72998**	**22514**	**51054**	**22940**	**31842**	**54245**
11071	**44430**	**94664**	**91294**	**35163**	**05494**	**32882**	**23904**	**41340**	**61185**
82509	**11842**	**86963**	**50307**	**07510**	**32545**	**90717**	**46856**	**86079**	**13769**
07426	**67341**	**80314**	**58910**	**93948**	**85738**	**69444**	**09370**	**58194**	**28207**
57696	**25592**	**91221**	**95386**	**15857**	**84645**	**89659**	**80535**	**93233**	**82798**
08074	**89810**	**48521**	**90740**	**02687**	**83117**	**74920**	**25954**	**99629**	**78978**
20128	**53721**	**01518**	**40699**	**20849**	**04710**	**38989**	**91322**	**56057**	**58573**
00190	**27157**	**83208**	**79446**	**92987**	**61357**	**38752**	**55424**	**94518**	**45205**
23798	**55425**	**32454**	**34611**	**39605**	**39981**	**74691**	**40836**	**30812**	**38563**
85306	**57995**	**68222**	**39055**	**43890**	**36956**	**84861**	**63624**	**04961**	**55439**
99719	**36036**	**74274**	**53901**	**34643**	**06157**	**89500**	**57514**	**93977**	**42403**
95970	**81452**	**48873**	**00784**	**58347**	**40269**	**11880**	**43395**	**28249**	**38743**
56651	**91460**	**92462**	**98566**	**72062**	**18556**	**55052**	**47614**	**80044**	**60015**
71499	**80220**	**35750**	**67337**	**47556**	**55272**	**55249**	**79100**	**34014**	**17037**
66660	**78443**	**47545**	**70736**	**65419**	**77489**	**70831**	**73237**	**14970**	**23129**
35483	**84563**	**79956**	**88618**	**54619**	**24853**	**59783**	**47537**	**88822**	**47227**
09262	**25041**	**57862**	**19203**	**86103**	**02800**	**23198**	**70639**	**43757**	**52064**

Attachments

Attachment 1. Water Quality Field Collection Data Form

Department of Planning and Natural Resources
Division of Environmental Protection
FIELD COLLECTION DATA FORM

Survey Name & Location:_____
Date (mm/dd/yy):_____
Samplers:_____

Station ID (GPS)	Time	Depth (m)	Temp (°C)	Salinity	DO (mg/L)	pH	Turb (NTU)	Secchi (m)	Notes
		Surface							
		Bottom							
		Surface							
		Bottom							
		Surface							
		Bottom							
		Surface							
		Bottom							
		Surface							
		Bottom							
		Surface							
		Bottom							
		Surface							
		Bottom							
		Surface							
		Bottom							
		Surface							
		Bottom							

Attachment 2. Chain of Custody Form

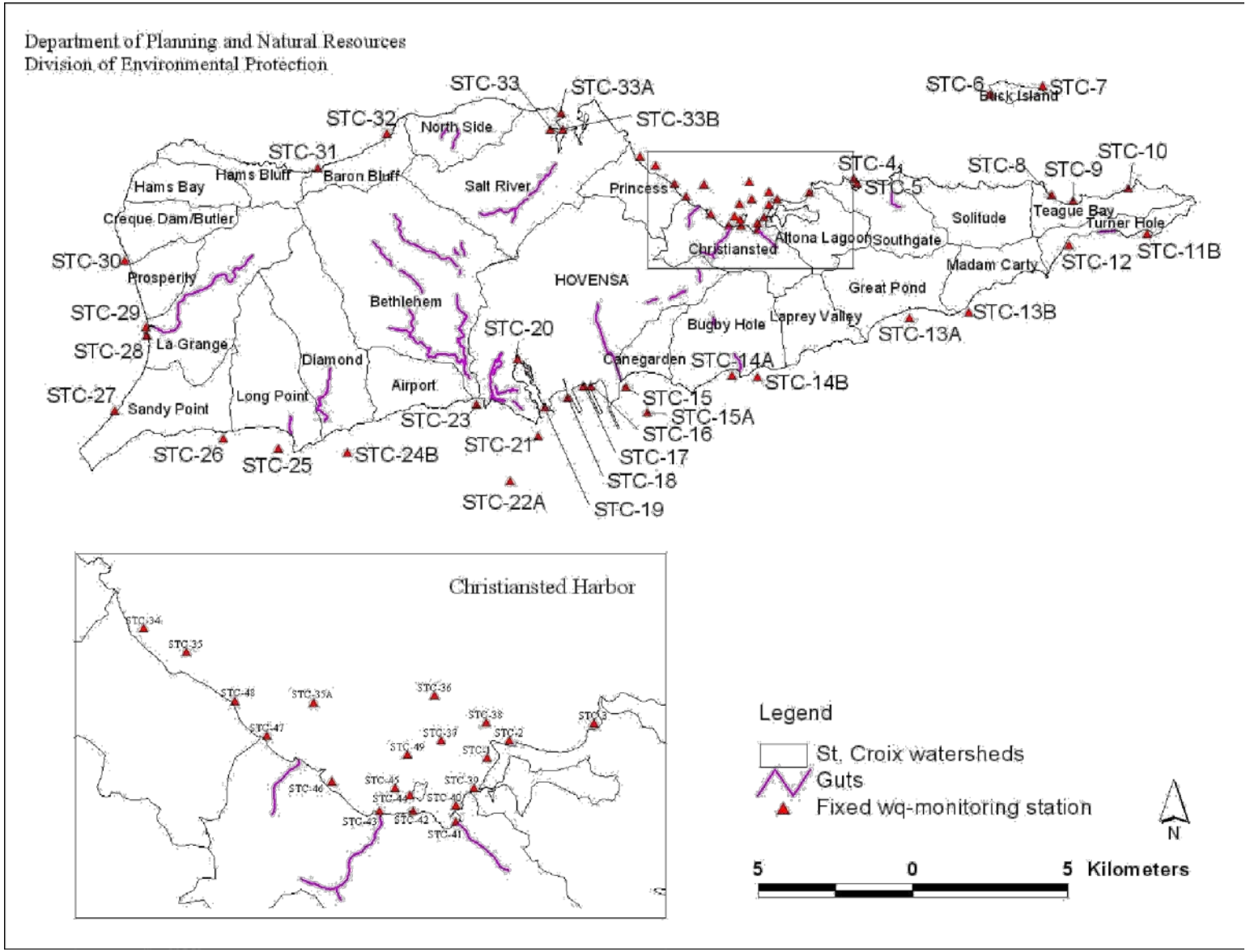
Department of Planning & Natural Resources
Division of Environmental Protection
#45 MARS HILL
FREDERIKSTED, ST. CROIX, USVI 00840
(340) 773-1082 Phone
(340) 773-9310 Fax

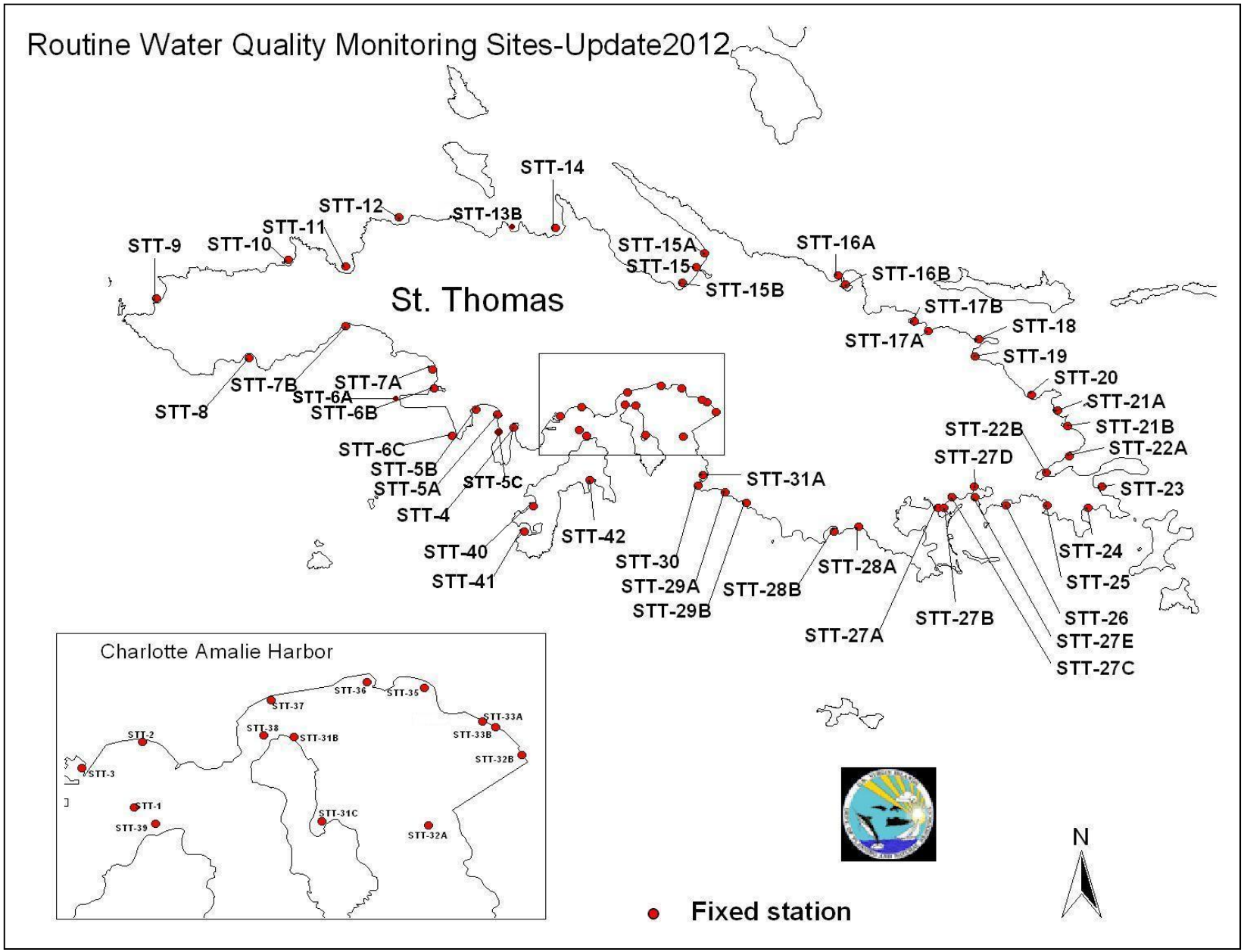
SERIAL SHEET No._____

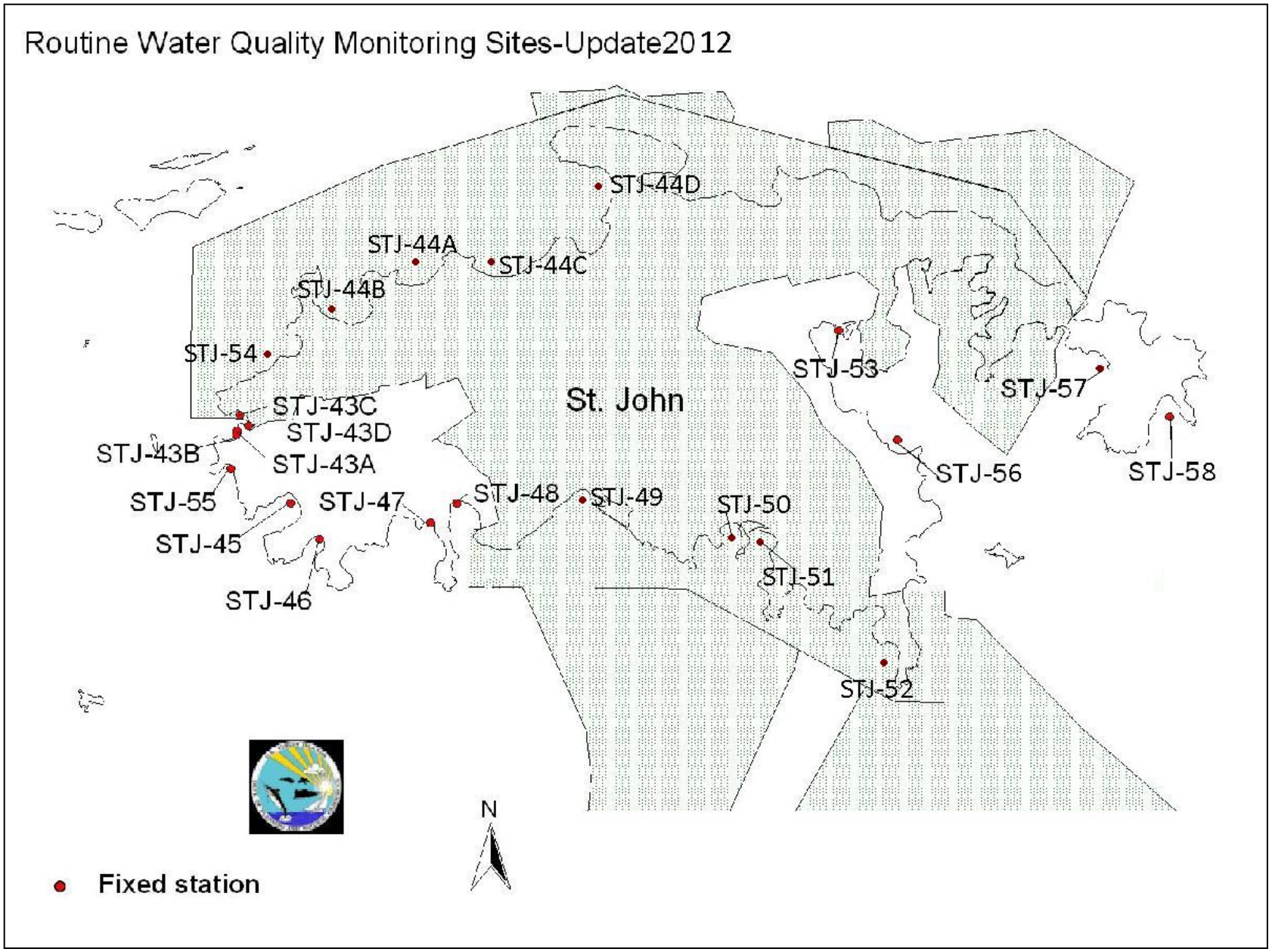
CHAIN OF CUSTODY RECORD

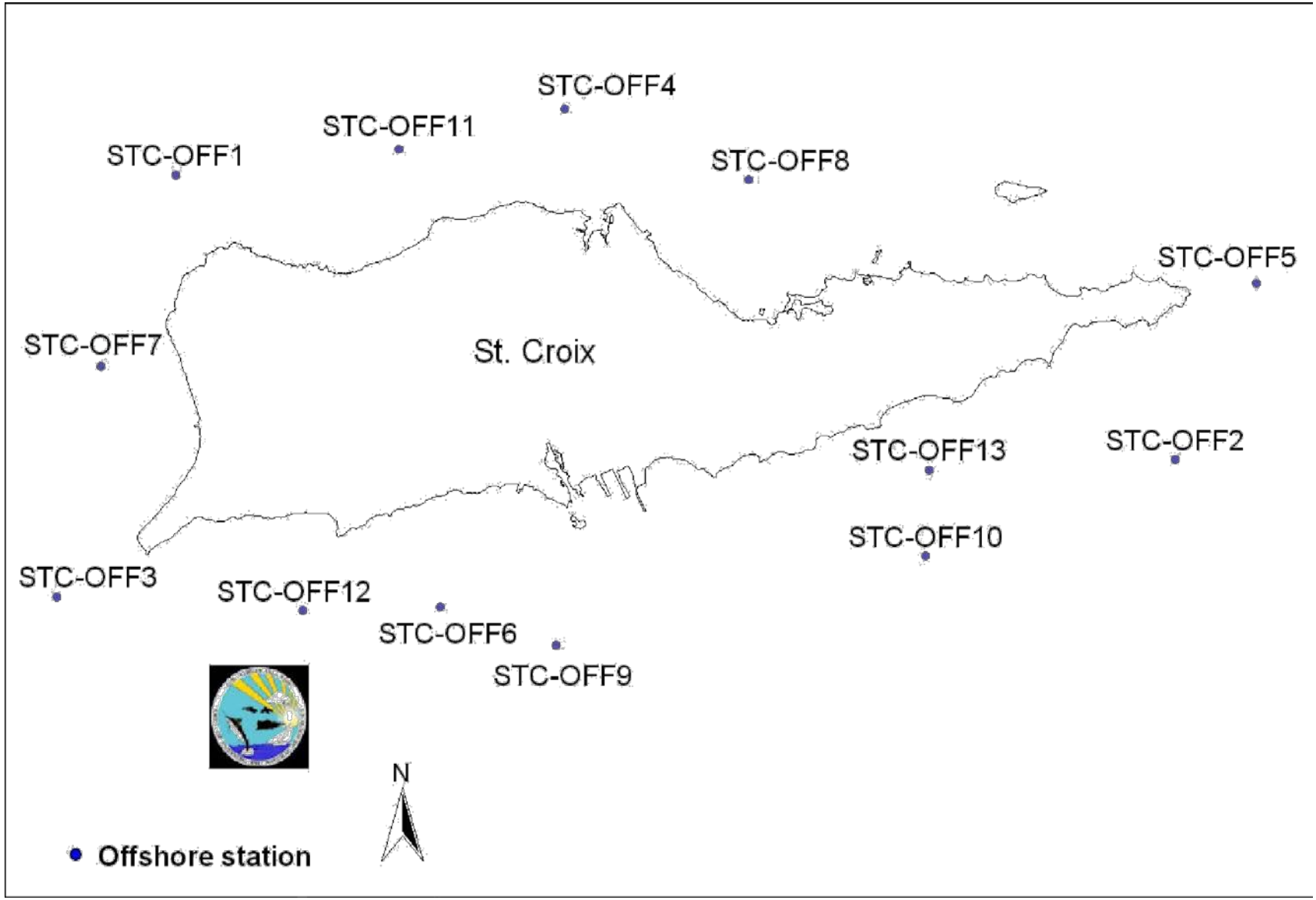
Survey Name & Location:				**Samplers:**			
Station ID	**Station Name**	**Date**	**Time**	**Sample Type**			**Analysis Required**
				Water		**Air**	
				COMP	**GRAB**		
Relinquished by: (*signature)* **DATE/TIME**				**Received by:** (*signature)* **DATE/TIME**			
Relinquished by: (*signature)* **DATE/TIME**				**Received by:** (*signature)* **DATE/TIME**			
Relinquished by: (*signature)* **DATE/TIME**				**Received by:** (*signature)* **DATE/TIME**			
Comments: (*preservative/method of shipment)*							

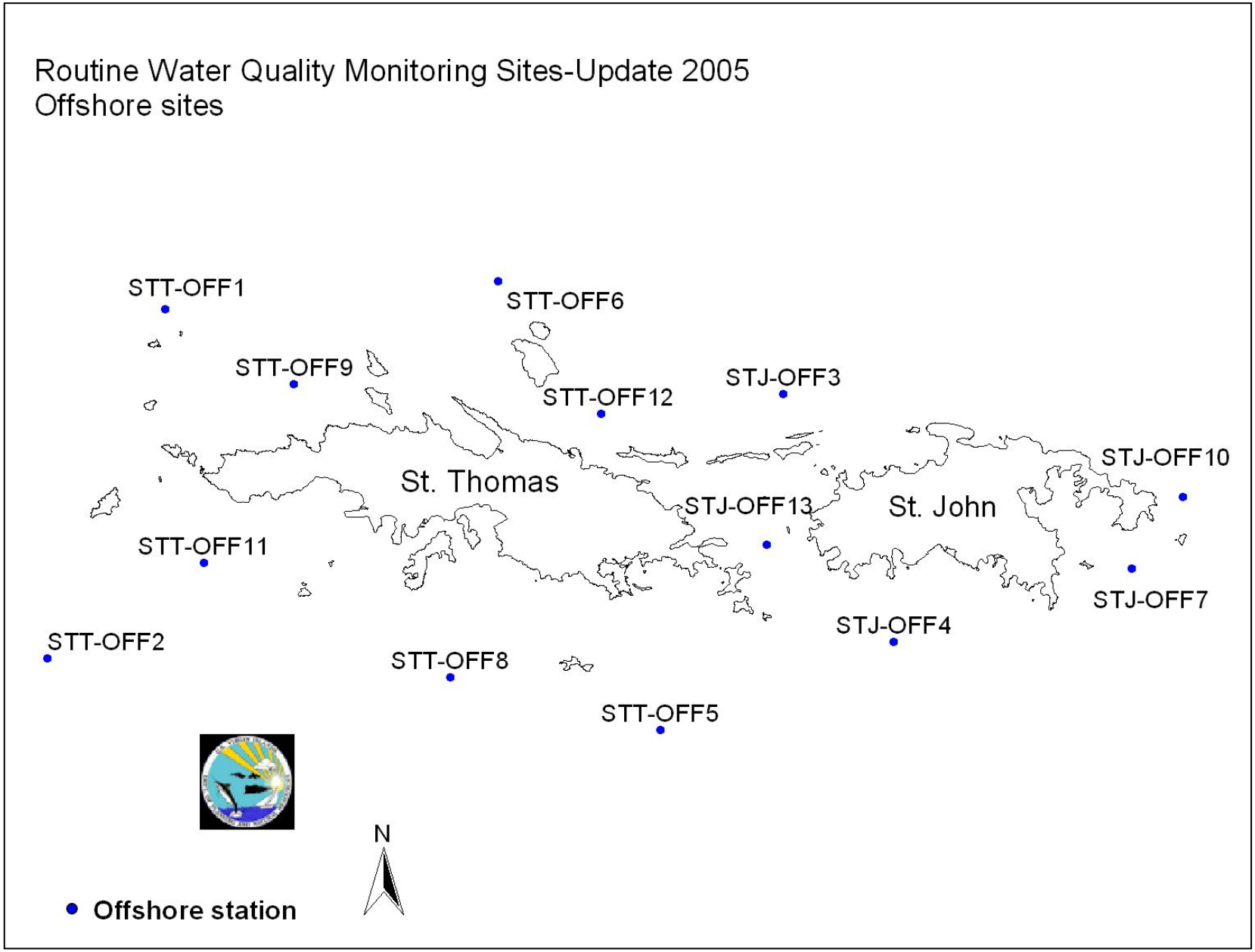
Attachment 3. Ambient Monitoring Field Maps


Department of Planning and Natural Resources
Division of Environmental Protection
STC-33
STC-33A
STC-33B
STC-32
North Side
STC-31
Hams Bluff
Baron Bluff
Hams Bay
Salt River
Princess
STC-6
Buck Island
STC-7
STC-4
STC-5
STC-8
STC-9
STC-10
Creque Dam/Butler
Solitude
Teague Bay
Turner Hole
STC-30
Christiansted
Altona Lagoon
Southgate
STC-11B
Prosperity
Madam Carty
STC-12
HOVENSA
Great Pond
Bethlehem
STC-29
Bugby Hole
Laprey Valley
STC-13B
STC-20
STC-13A
STC-28
La Grange
Diamond
Canegarden
STC-14A
STC-14B
STC-27
Airport
STC-15
Sandy Point
Long Point
STC-15A
STC-23
STC-16
STC-21
STC-26
STC-25
STC-24B
STC-17
STC-18
STC-22A
STC-19
Christiansted Harbor
Legend
St. Croix watersheds
Guts
Fixed wq-monitoring station
N
5
0
5 Kilometers


Routine Water Quality Monitoring Sites-Update2012
St. Thomas
STT-14
STT-12
STT-13B
STT-11
STT-9
STT-10
STT-15A
STT-15
STT-15B
STT-16A
STT-16B
STT-17B
STT-18
STT-17A
STT-19
STT-20
STT-21A
STT-21B
STT-22B
STT-22A
STT-27D
STT-23
STT-7B
STT-7A
STT-6A
STT-8
STT-6B
STT-6C
STT-5B
STT-5A
STT-5C
STT-4
STT-31A
STT-42
STT-40
STT-41
STT-30
STT-29A
STT-29B
STT-28B
STT-28A
STT-24
STT-25
STT-26
STT-27B
STT-27A
STT-27E
STT-27C
Charlotte Amalie Harbor
STT-36
STT-35
STT-37
STT-33A
STT-38
STT-31B
STT-33B
STT-2
STT-32B
STT-3
STT-1
STT-31C
STT-39
STT-32A
N
Fixed station


Routine Water Quality Monitoring Sites-Update2012
St. John
STJ-44D
STJ-44A
STJ-44C
STJ-44B
STJ-54
STJ-43C
STJ-43D
STJ-43B
STJ-43A
STJ-55
STJ-47
STJ-48
STJ-49
STJ-50
STJ-45
STJ-51
STJ-46
STJ-52
STJ-53
STJ-57
STJ-56
STJ-58
N
Fixed station


STC-OFF4
STC-OFF11
STC-OFF1
STC-OFF8
STC-OFF5
STC-OFF7
St. Croix
STC-OFF13
STC-OFF2
STC-OFF10
STC-OFF3
STC-OFF12
STC-OFF6
STC-OFF9
N
Offshore station


Routine Water Quality Monitoring Sites-Update 2005
Offshore sites
STT-OFF1
STT-OFF6
STT-OFF9
STT-OFF12
STJ-OFF3
St. Thomas
STJ-OFF10
STJ-OFF13
St. John
STT-OFF11
STJ-OFF7
STJ-OFF4
STT-OFF2
STT-OFF8
STT-OFF5
N
Offshore station